May 1, 1940

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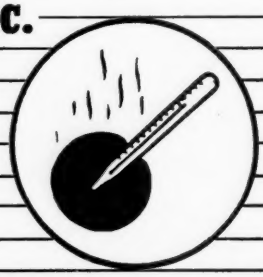

TEMPERATURE RISE

INDIA RUBBER WORLD

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Volume 102 **New York, May 1, 1940** **Number 2**

Rubber for Army Gas Masks[1]

Major M. E. Barker[2]

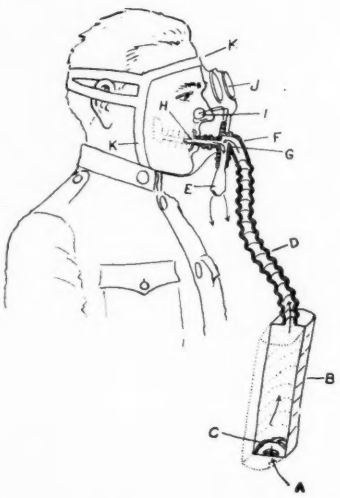


Fig. 1. Drawing Showing Nose Clip and Mouth Piece Used on British SBR and American R.F.K. Masks during the World War

THE U. S. Army believes in quality and is willing to pay for it. Army specifications and inspection services are designed to insure quality materials. The usual restrictions and rigidity of inspection are much intensified where gas masks are concerned for no one wants a gas mask that is "almost perfect." It must be perfect. Every mask produced is tested, and about 1% of all masks manufactured is tested to destruction. If a single mask out of a lot fails for any one of half a dozen reasons to meet specification requirements, the whole lot is condemned and destroyed.

Not so long ago a famous industrialist was taken through the Army gas mask assembly plant. After spending some hours watching the various operations he said, "That's the first manufacturing process I have ever seen where there was NO compromise with quality."

The soldier will want and need a quality mask if he must face gas. The noncombatant, also, has a right to expect a gas mask that will do its work silently and perfectly. The policy of the Army, through the Chemical Warfare Service, is to produce that kind of gas mask.

Essential Components of the Modern Mask

Modern military gas masks consist of four essential parts: facepiece, hosetube, canister, and carrier. First there must be a facepiece which gives a skintight fit on the face and so prevent gas from leaking in around the edges. During the World War the British Small Box Respirator and the American R.F.K. masks had nose clamps and mouth pieces (Figure 1). The wearer breathed through the mouth piece, and his nose was clamped shut. This model gave good protection, but was difficult to wear for more than an hour or so. Probably 15,000,000 of these masks were manufactured from 1916 to 1918. The present model does not depend on this method of sealing; but rather on the fit of the facepiece.

The parent of all modern masks was patented by Haslett in 1849 and is shown in Figure 2. This mask consisted of an India rubber facepiece, a hosetube, and a canister which could be exchanged for a long hose for supplying fresh air to the fireman who had to enter a burning building. The adsorbents then available for use as canister fillings impaired the effectiveness of the gas mask, but there is no question about his method of construction. Then there is the canister which, filled with adsorbent material, purifies the air before it reaches the wearer. There must also be some connection between the canister and the facepiece. In some types this takes the form of a corrugated hosetube; while in others it is merely a gastight joint holding the canister to the facepiece Finally there must be a carrier to hold the mask when it is not in use, which is the great majority of the time. The general arrangement of military gas masks and method of functioning are shown in Figure 3.

Of these four parts the facepiece is almost invariably made of rubber, for no other material gives quite so good a fit to the face or excludes toxic atmosphere so completely. Where a hosetube is used that, too, is made of rubber, for no other substance permits the construction of a corrugated hosetube so completely flexible when subjected to all types of twists and turns. Of course when we say "rubber" we include synthetic rubber of proper quality as well as natural rubber.

Types of U. S. Army Masks

Uncle Sam makes four types of gas masks for military purposes. The most common one, known as the Service Gas Mask, is shown in Figure 4. He makes special masks for his gunners, tank drivers, telephone operators,

[1] Any opinions stated herein are those of the author and do not, necessarily, carry the approval of the War Department or any of its agencies. AUTHOR'S NOTE.

[2] Chemical Warfare Service, War Department, Washington, D. C.

aviators, and the like. Since these masks are made in relatively small numbers and for special purposes, we shall call them Special Masks, one of which, the Optical Gas Mask, so called because its wearer, artillery observers and others, can use optical instruments with facility and accuracy, is shown in Figure 5. For use in training soldiers a cheaper and lighter grade of mask is made, called the Training Mask. The needs of the noncombatants are met in full degree by what is known as the Noncombatant Mask. We will consider these masks in some detail in the order in which they are mentioned above.

The Service Gas Mask

The Service Gas Mask requires about one pound of rubber (including waste) per mask in its manufacture. No scrap or reclaimed material is permitted since such materials often contain antioxidants and accelerators that are toxic when worn in close contact with the skin. In the Service mask the facepiece is molded in a flat blank faced on one side with stockinet that serves to protect the rubber from deleterious effects of the direct rays of the sun. These blanks have certain reenforcing tabs vulcanized or molded in place to take the strains where the headharness and other component parts are sewed together.

In assembly operations the blanks come to the plant from the rubber manufacturer and are checked as to thickness and weight. Samples are taken for various physical tests, including accelerated aging. Ten one-inch square pieces are cut from representative blanks and fastened to the skin of a number of workers and left there for 24 hours to determine whether or not the rubber is toxic to the human skin. Sometimes peculiar changes take place during vulcanization; so Uncle Sam cannot rely solely on knowing what constituents go into the compound. Details as to the quality and tests of gas mask rubber are covered in U. S. Army Specification No. 20-75B, which is amended from time to time to permit the use of various antioxidants and accelerators that have proved satisfactory.

When the rubber faceblanks have been accepted, they pass through a complex assembly line in about the following order, as shown in Figure 6: (1) blank as received; (2) blank cut to size by dies; (3) holding straps and buckles sewed in place; (4) eyepiece binder ring and eyepieces placed and sealed. Next the chin seam is sewed with a baseball stitch and vulcanized; the angletube is inserted, sealed, and the headharness attached. The completed facepiece is then attached to the hosetube, and this in turn is fastened to the canister.

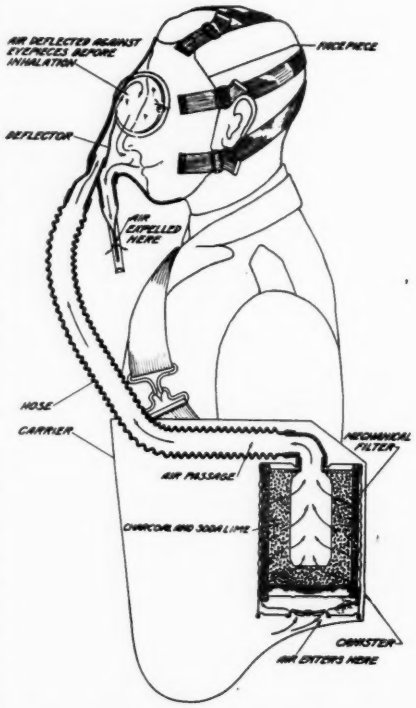


Fig. 3. Passage of Inspired and Expired Air Shown in Sectional View of Present-Day U. S. Army Service Gas Mask, Far More Comfortable than the 1917 Model

The mask is assembled in the carrier, shown in Figure 7, and this placed in a metal box, as shown in Figure 8. Several of these cans are then placed in a bell jar which is evacuated and filled with nitrogen. After the second evacuation and filling with nitrogen the can is sealed and tested for leaks, and the individual containers (hermetically sealed and nitrogen filled) are packed in boxes, after which the masks are ready for shipment and storage. The mask and its rubber parts will undergo little, if any, deterioration in the presence of nitrogen, an inert gas, and, therefore, will retain their original quality as long as the gastight seal remains intact.

In the Service Gas Mask the facepiece is made of good grade plantation or wild rubber with suitable fillers to which are added certain allowable accelerators, antioxidants, and other inhibitors. The specification requires at least 85% by volume of natural rubber, and the finished blank must be non-blooming. Facepiece and hosetube are made of similar stock, and both are covered on the outside with olive drab stockinet which matches the soldiers' uniform in color and gives mechanical protection to the rubber and shields it from the

L. P. Haslett,
Lung Protector.
No 6,529. Patented June 12, 1849.

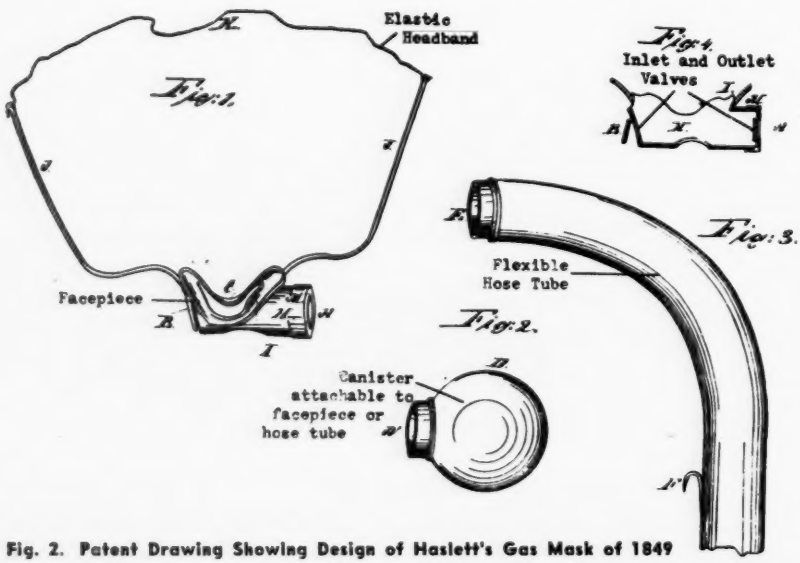


Fig. 2. Patent Drawing Showing Design of Haslett's Gas Mask of 1849

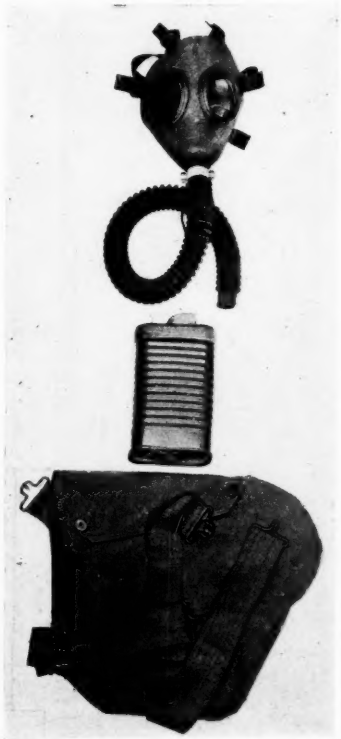


Fig. 4. Four Major Components of Service Gas Mask: Facepiece, Connecting Hose, Canister, and Carrier

A rubber deflector on the inside of the mask throws incoming air against the eyepieces and so keeps them clear in all kinds of weather. In the canister, rubber spacers hold the metal parts the proper distance apart, yet give them enough movement so that they do not buckle easily. The rubber inlet valves permit air to pass into the bottom of the canister, but prevent exhaled air from passing out through the canister. This exhaled air would wet the adsorbents and reduce direct rays of the sun.

In addition to these parts rubber is used in several other places in the gas mask. The outlet valve and the inlet valve in the bottom of the canister are made of black molded rubber which contains an appreciable amount of paraffin. Rubber gaskets seal the eyepieces against entry of air or gas. An elastic head-harness (see Figure 9 for various models used, with No. 2 standard for Service Gas Masks), adjustable as to tension and easily replaceable, holds the mask in place on the wearer's head. Although many forms of metal springs have been used in the head-harness, rubber web is the most comfortable to the wearer. their general efficiency for air purification. The carrier is the only part of the complete gas mask that does not depend upon rubber for many vitally important structural and functional features.

Special Masks

In the special types of Service Gas Masks the facepiece is molded to proper form in one piece and the head-harness holding straps are fastened to the rubber by means of suitable metal studs. In other respects the special types of masks are essentially the same as the Service mask, though not quite so rugged in construction. They are not intended for the hard field use to which the Service mask may be put.

Training Masks

In the Training Mask the facepiece is molded, and a small canister is attached directly to the facepiece, in much the same manner as is shown in Figure 10. This small canister may be removed, and a service hosetube and canister attached, thus making this mask suitable for use in war. No stockinet is used over either the Training or Special mask facepieces since it is trouble enough to mold the facepieces to the exact form required without cementing stockinet to them. The small canister attached directly to the facepiece is

Fig. 5. Optical Gas Mask

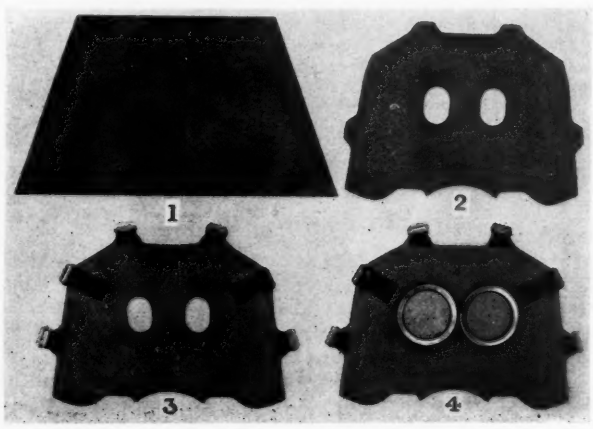


Fig. 6. Four Stages of Manufacture of Facepiece for Service Gas Mask: (1) Blank as It Comes from Mold and (2) after Die Cutting to Shape and Size; (3) Facepiece with Head-Harness Tabs and Buckles Sewed in Place and (4) with Eye Pieces Added

Fig. 7. Completed Gas Mask Packed in Carrier

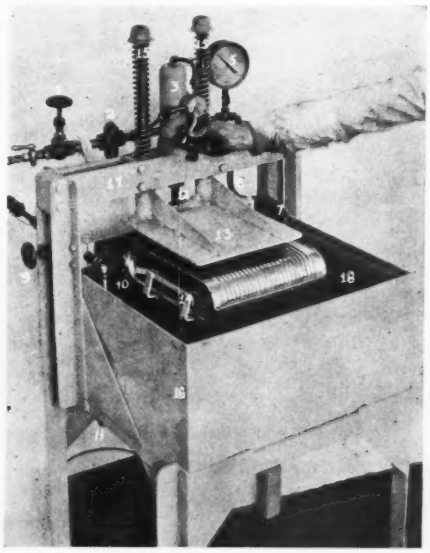


Fig. 8. Complete Outfit, Mask and Carrier as Shown in Fig. 7, Sealed in Can Filled with Nitrogen, Which Is Undergoing Final Test

satisfactory for training purposes and limited use in the presence of poison gas. However it does not have sufficient capacity for field service against unknown quantities of many possible gases. For that reason it is necessary to have a canister of considerable size on gas masks intended for use by soldiers under active field conditions.

The Noncombatant Mask

The noncombatant mask is intended for emergency use only. Such an emergency would be present when and if this country is invaded or an enemy is able to fly over our cities and liberate great tonnages of gases. There may be a deficiency of rubber then. Consequently this mask is designed to use a minimum amount of rubber. The facepiece, for instance, is made of two layers of cloth with a sandwich of synthetic rubber holding the layers together; while the cloth is coated on both sides or impregnated with a suitable plastic gasproof material. The inside edge of the facepiece in contact with the face is covered by a strip of leather one inch wide. It is true that the job could be done better by a suitable facepiece of all-rubber construction, but that would take millions of pounds of rubber that might be needed for other purposes for which there might be no substitute. The construction described above gives excellent results and ample protection. In this mask the canister is attached directly to the facepiece. The eyepieces are sewed to the fabric; stitches are covered; and another layer of cloth is cemented around the eyepieces to give sufficient reenforcement to prevent an excessive bellows action when the wearer breathes. The canister is identical with that used on the Training Mask and provides ample protection against all war gases that might be used against noncombatants who are not required to do prolonged hard work during a gas attack. Figure 10 shows a noncombatant gas mask of the better type made by the millions in Europe. The facepiece is made of strong closely woven canvas impregnated with rubber and having a soft leather band cemented to the inner edge of the facepiece. The canister is readily removable so as to facilitate replacement. Practically all civilian or noncombatant masks are made along this general pattern.

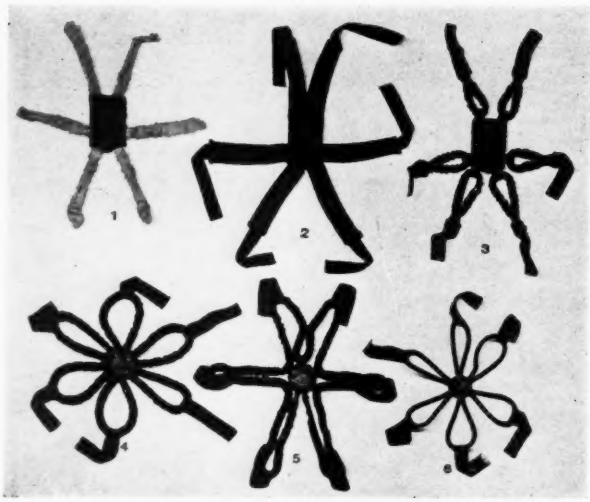


Fig. 9. Various Types of Head-Harnesses Used on Gas Masks

Fig. 10. Parts of Gas Mask of European Manufacture for Civilian Use: (1) Heavy Rubberized Fabric Facepiece; (2) Head-Harness of Cloth-covered Metal Springs; (3) Head-Harness Lifting Strap; (4) Eyepieces of Cellulose Acetate; (5) Eyepiece Binder Rings; (6) Anti-dim, Sheet Holding, Spring; (7) Outlet Assembly; (8) Outlet Valve and Housing; (9) Connector Which Replaces Hose Tube in Military Models; (10) Canister Where Air Is Purified; (11) Fiber Carrying and Storage Case

Undisclosed Details

The foregoing brief description and illustrations should give the reader a good idea of how gas masks are made and how they function. No attempt has been made to go into the details of construction and the tests which are applied. Such information is available to properly accredited American manufacturers in the form of specifications, drawings, directions for test, and other technical information. Such information is not furnished except to those manufacturers whose facilities are allocated to the Chemical Warfare Service of the Army for either peace or emergency procurement.

The citizen, however, can rest assured that his government is building types of masks that will meet the needs of the user, and building these masks just as perfectly as human skill and good tools will permit. In the construction of all types of gas masks it will be found that high-grade rubber plays an important part.

Rubber from Tomato Skins

According to the *Rubber Age (London)*,[1] Dr. Mauri, of Parma, Italy, has perfected a process by which, it is claimed, first-class rubber can be manufactured from tomato skins. It is indicated that from the 800,000 tons of tomatoes produced annually in Italy, some 2,000 tons of rubber could be manufactured.

[1] Feb., 1940, p. 337.

Bonding Rubber to a Ferrous Metal

A recent patent[1] states that a rubber compound containing sulphide of phosphorus may be satisfactorily bonded to a ferrous metal without the necessity of first plating the metal with a brass alloy. The assembled product must be heated to obtain adhesion and is preferably subjected to pressure and heat sufficient for vulcanizing.

[1] U. S. patent No. 2,165,818, July 11, 1939.

Cement-Latex Mixtures: Their Composition and Applications

H. J. Stern[1]

THE subject of cement-latex mixtures is one which has received of late a certain amount of attention in the literature. The articles which have appeared, however, fall into one or other of two extremes. They are either of a detailed scientific nature, somewhat remote from actual practice, or they are popular accounts showing what has been done with these mixtures, but giving very little technical information. Apart from such articles the patent literature reveals much information. The present article refers to work carried out or published in England, where the use of cement-latex mixtures has reached such proportions that it is no exaggeration to consider it the largest individual latex using industry in England at present.

The idea of using cement in combination with latex is not of recent origin, and many of the latest developments may well be considered as revivals of processes suggested many years ago. One early patent of 1923[2] referred to the use of latex in connection with water binding or water absorbing substances. An even earlier patent is French patent No. 438,061 of 1912.

These early pioneers must have been greatly handicapped by the lack of latex supplies of reliable and uniform quality such as have been available only in recent years and now give great assistance to workers in this field.

Compounding and Preparation

While any kind of latex may in theory be used, in practice the question of stability arises, since the danger of coagulation on adding a dry powder, such as cement, to latex is one which must always be borne in mind. The danger of coagulation is considerably less when using aluminous cement.

It is obvious also that in order to avoid excessive water, the greater the percentage of rubber desired in the final result, the more concentrated must be the latex used.

For these two reasons Revertex, obtained by an evaporation process, has been used in many of the largest contracts so far executed, but it is possible to add stabilizers to other latices, such as those which have been concentrated by creaming or centrifuging.

One of the earliest patents was that of V. Lefebvre,[3] which covered the use of cement in connection with flocculated latex. Many processes have been developed involving flocculatd latex, but they have been less successful than those involving a straight cement-latex mix, such as was described by S. McM. Kirkpatrick in 1924,[4] who used a stabilized latex with cement. The most important patents, however, date from about the year 1930 and on.

British patent No. 369,561 of 1930[5] describes the preparation of coatings intended for use to resist acids and other corrosive materials. A typical formula taken from this patent follows:

Oz.	Ingredient
208.0	Concentrated Latex—Revertex
5.0	Stabilizer—Saprotin (preferably added as 30% solution)
2.0	Accelerator—Vulcacit P.
6.4	Sulphur
3.2	Zinc Oxide
6.4	Carbon Black
90.0	Sand
320.0	Alumina Cement

It is said that such a composition is suitable for lining tanks and other vessels and that it will resist the action of 10% boiling nitric acid.

Some advantages of the method are described in the patent. The composition being plastic, can be laid with ease by unskilled labor. For small jobs the only tool required is a trowel, and for large jobs an ordinary shovel is quite adequate. The mixing of the composition is very simple, requiring no special plant.

Claims are also made for the use of such compositions for roadmaking, but it is obvious that the considerations of cost outlined above will have nullified attempts in this direction.

A later patent[6] describes decorative effects which may be obtained on the basis of the composition described in connection with the previous patent. The technique followed was that used by the makers of terrazzo and similar composition floorings for centuries, having apparently been used by the Romans. It consists in pressing small pieces of colored tiles, stones, etc., into the surface of the composition after it has been laid, but while it is still in the plastic state.

"Suitable decorative materials that may be pressed into the surface of the above-mentioned paste for the production of the decorative coatings or coverings may for example comprise one or more of the following materials: pieces of vulcanized rubber sheeting, hard wood, leather, porcelain or earthenware tiles and marble slabs of regular or irregular shapes according to the desired decorative effect to be obtained."

Another interesting claim is that the composition prepared from the latex and filling materials, when set, constitutes a jointless rubber covering of a hard or semi-hard nature that prevents moisture from creeping under the uppermost decorative surface, thus enabling strong and lasting adhesion of the decorative pieces of material.

A further development[7] simplified the production of decorative effects besides giving a composition of a considerably lower cost. Instead of pressing loose pieces into the surface of the moist composition before setting, such pieces were mixed with the composition which was allowed to set.

"A highly satisfactory composition is as follows:

"Rubber latex of 60% concentration	100 lbs.
"Casein glue	5 lbs.
"Cork crumb	10 lbs.
"Hydraulic cement	30 lbs.

"The volume of the cork and latex in this composition are about the same.

"This composition, which has water-proof and sound-insulating properties, has the consistency of paste and can be spread to form any desired jointless covering. In particular it may advantageously be used in place of compressed cork. The composition just set forth will not stretch but is flexible. . . . If it is placed beneath vulcanized rubber carpeting it is advisable to let the composition set completely before applying the carpeting and thereafter to use a naphtha solution to cause the carpeting to adhere."

In this patent the first mention is made of the uses to

[1] Consulting chemist, London, England.
[2] British patent No. 214,224, R. Ditmar.
[3] British patent No. 217,279, 1923.
[4] British patent No. 242,345.
[5] R. Critchley, Ltd., and A. E. Bond.
[6] British patent No. 382,756, A. E. Bond, 1931, now void.
[7] British patent No. 441,765, A. E. Bond and T. T. K. Crossfield, 1936.

which such compositions have been largely put. "The final composition is of very light weight. The use of cork in granulated or thin shredded form is particularly advantageous from this point of view and the mixes set forth above will produce compositions which are very suitable for laying floors on ships, for example, where weight, particularly in the upper parts of the vessel, is of great importance. The flexibility and resilience of the compositions are also of importance here because they allow the floors to give with movements of the structure of the ship without causing cracks to appear.

"Another composition which has been found to give particularly good results is as follows:

"Rubber latex (100 lbs. solids)	140 lbs.
"Casein glue	7 lbs.
"Granulated cork (particle size about ⅛-inch)	40 lbs.
"Aluminous cement	50 lbs.

"A further mix which has been found to give good results from the point of view of thermal and acoustic insulation and which can be used, for example, in motor cars for damping vibrations can be made up as follows:

"Rubber latex (40% concentration)	100 lbs.
"Casein glue added in powder form	5 lbs.
"Granulated cork (particle size about ⅛-inch)	35 lbs.
"Aluminous cement	70 lbs.

"By adding mica powder or asbestos, a composition can also be made in accordance with the invention which has particularly good fire-proofing properties and can be advantageously used for lining cinema projector rooms, for example. The high thermal insulating properties of such a composition also make it suitable for use in lining cold storage chambers, lagging steam pipes and analogous purposes.

"Compositions made according to the above particulars form plastic masses which can be spread by means of a trowel and allowed to set in situ. The ingredients, other than the cement, can first of all be mixed to form a paste and the cement can be added to this paste in the required quantities immediately before the composition is laid. No expensive plant or tools are required either for the mixing of the materials or for the laying and only semi-skilled labor is required."

According to British patent No. 481,620[8] it is possible to mix a dry latex stabilizer, such as sodium carbonate, with the cement so that on mixing with the latex the danger of coagulation is reduced.

"A powdered material is made consisting of 100 lbs. of Portland cement, 5 lbs. sodium carbonate in finely divided crystal form, 20 lbs. whiting, 2 lbs. of powdered casein and 3 lbs. of hydrated lime, and this powdered mixture is mixed with 130 lbs. of latex of from 40 to 45% concentration."

The Swedish Invention Corp.[9] claimed a number of compositions for similar purposes. It pointed out the already known fact that cement-latex compositions have excellent adhesive properties. A further patent application of a similar kind is British patent No. 487,101[10] in 1938; while earlier still in British patent No. 202,652,[11] it had been proposed to prepare composite latex sheets by treating latex on the plantation with cement and passing it through a creping machine.

As a result of the study of the above patents, it will be realized that the present practice consists in mixing a stabilized latex with cement and adding at the same time such fillers as are needed for insulating or decorative purposes or for lowering the cost of the mix. Where the coatings are required for acid resisting purposes, suitable fillers, such as fine sand, will be chosen. Where sound or heat insulation is called for, the fillers, or aggregates as they are usually termed, will be cork, asbestos, or other suitable material.

Decorative effects require a special finishing treatment as the following example will show:[12]

"A homogeneous paste is first prepared by mixing with rubber latex the various undermentioned ingredients in the following approximate proportions:

	lb.
"Concentrated Latex (approximately 70% dry solid content)	130
"Casein-base cold water glue	3
"Sulphur	5
"Zinc oxide	5
"Sodium-pentamethylene-dithio-carbamate	1
"China clay	25
"Asbestos powder	5
"Alumina	25
"Calcium hydroxide	60

"With the paste prepared from the ingredients above mentioned there are then incorporated about 260 lb. of small irregularly shaped pieces, about ⅛ to ⅜ inches in diameter, of vulcanized rubber of any desired color, or marble chips, colored stones or glass, or aluminum or other metal chippings. The composition so produced is then spread directly on to the surface to be covered, such as the floor surface, by means of a trowel or shovel and then allowed to set and dry, for which the time required is usually about 24 to 48 hours, whereafter the surface of the composition is ground, faced or polished by any of the usual floor surfacing apparatus, thus leaving a jointless floor surface showing a terrazzo or mottled decorative effect."

It will be noted that the composition is to be "ground, faced or polished." It is here that difficulties may be encountered, and they will be referred to again later.

Relating to the chemical aspects involved in mixing cement and latex, one of the most interesting recent patents is British patent No. 484,712,[13] the investigators of which are the first to have recognized that many of the previous faults in cement-latex composition are attributable to definite factors. The chief of these is the amount of water added as part of the latex. While a certain amount is needed for hydration of the cement, the excess must be evaporated, which action causes shrinkage and is liable to result in cracking. Therefore concentrated latex is recommended. At the same time it must be recognized that the fillers used may absorb water or require a certain amount in order to wet them properly.

"The use of a concentrated latex," say the patentees, "is to ensure that the amount of water in the mixture does not substantially exceed 12½% by weight of the cement."

While this is in the main true, some variations may be called for, owing to the factors just mentioned. Among other interesting facts brought out in this patent is that the addition of small amounts of potassium hydroxide assists the setting of the mix by hydration rather than evaporation, and stabilizers, such as saponin or the potassium salts of fatty acids, act in the opposite way. The adverse effect of such stabilizers may, however, be counteracted by adding sufficient potash, caustic soda, or lime.

In the above patent the following formula is given as a typical example—parts are by weight.

Aluminous Cement	100.00
Latex (60% Dry Rubber Content)	50.00
Caustic Potash	2.00
Saponin	0.25
Sodium Silicate—$Na_2SiO_3.5H_2O$	1.20
Total Water	2.50
Vulcanizing Ingredients	2.00

"The sodium silicate is added to the latex as a 40%

[8] A. E. Bond, 1938.
[9] British patent No. 405,939, application date 1932, void.
[10] G. Schuster, F. Hoffman, and E. Kubler & Co., 1938.
[11] H. S. Wills, 1922.
[12] British patent No. 382,709, A. E. Bond, 1931, void.
[13] Rubber Producers Research Association, W. G. Wren, G. Martin, A. T. Fairclough, and W. S. Davey, 1938.

solution, and the saponin as a 50% solution. This is followed by the caustic potash which is added to the latex as a 50% solution and then the vulcanizing ingredients also dispersed in water are added.

"The aluminous cement is then added slowly with vigorous stirring to the compounded latex. If required, the cement may be mixed with granite, marble chippings, cork, wood-flour, or other suitable filling materials before addition to the latex."

Properties and Applications

The method of applying cement-latex compositions may now be described, and some of the chief uses considered. From the quotations already given, it will be seen that no special apparatus is needed, and that, at any rate for small quantities, a trowel or a shovel may be used to incorporate the cement with the compounded latex. A commonly used method is to spread the cement in the form of a ring on a piece of iron or concrete and pour the latex in the center. The cement is gradually worked in from the outside by stirring and crushing with a trowel or spade until a smooth paste is obtained. For larger quantities a cement mixer may be used. Any containers, tools, etc., used to make the mixture, must be washed clean immediately. If the composition is allowed to set, it becomes almost unremovable since it is unaffected by all ordinary chemical agents and it adheres so strongly that it is almost impossible to chip or scrape it off.

An outstanding feature of cement-latex compositions is that surfaces normally difficult of adhesion may be made to adhere with great strength. Glass, tiles, porcelain, and other substances with a smooth surface may be securely fastened to stone, brick, iron, wood or, in fact, any other material. Cement-latex compositions are used in England to a considerable extent for tile work and for fastening glass, such as in the manufacture of furniture, built-up mirrors, etc. The bond is so strong that no metal fasteners are required. These compositions are also used for fastening mirrors on walls by applying the cement at only a few places on the back. It is unnecessary to coat the entire surface. For these purposes the mix is usually of high viscosity to prevent running or dripping. These adhesives have no action on the silvering on mirrors.

The large tiles used for decorating shop fronts, passages in offices, etc., may also be fixed with cement-latex mixtures. Vibration or slight movement of the walls or floors leaves the adhesive unaffected. Ordinary cements crack and powder away under these conditions; whereas the latex compositions, being slightly elastic, yield under the strain and return to their original position.

One extremely important use for adhesive purposes is described in British patent No. 482,259.[14] If the claims of this patent are realized, it should bring about a very great change in ship construction.

"This invention relates to an improved ship's deck covering and has reference to the covering of the outer decks or weather-decks of ships, which have heretofore usually been covered with teak or other wood planking bolted to the steel deck plating, the deck plank seams being caulked with a filling of oakum driven into the seams, the top surface having marine glue filling.

"According to the present invention the steel deck plating is covered with a sub-deck comprising a layer of rubber latex compounded with a dehydrating binder or hydraulic cement and a comminuted filling substance, wood planking, preferably of reduced thickness as compared with the thickness of the wooden deck planking at present usual, being laid upon the sub-deck and being embedded in an adhesive layer comprising rubber latex compounded with a dehydrating binder or hydraulic cement, the adhesive layer uniting the wood planking to the sub-deck and filling the seams between the wood planking. The composite sub-deck unites itself firmly to the steel deck plating and the adhesive layer becomes homogeneous with and firmly integral with the composite sub-deck, thus causing the wood planking to be firmly and securely fixed to the steel deck plating without the use of bolts for connecting the wood planking to the steel deck plating.

"The composition used for the sub-deck preferably consists of preserved rubber latex, an aluminous cement and granulated cork, with or without additional comminuted filling substances, the proportions of the ingredients being preferably of the order of one part by weight of latex to three parts by weight of the cement and one half by weight of the granulated cork.

"The adhesive composition in which the wood planking is embedded preferably comprises preserved rubber latex compounded with an aluminous cement in the proportions of approximately one part by weight of the latex to two parts by weight of the cement.

"In carrying out the invention as applied to overlapping steel deck plating, the latter is first covered with the sub-deck composition in a plastic state, the layer of sub-deck composition tapering in thickness from one overlapping joint of the deck plating to the next overlapping joint so as to provide a smooth even sub-deck surface, which is allowed to set or harden. The thickness may taper, for instance, so that the minimum thickness of the sub-deck layer is preferably not less than ⅛-inch. The wood planking may be teak wood or other wood of any suitable thickness embedded in a thin layer of the adhesive composition.

"The improved deck covering is completely watertight, as water cannot penetrate the sub-deck layer, so that water cannot reach the steel deck plating. This is of great utility in the construction of decks for insulated vessels.

"The improved deck covering has the further advantage that it adds considerable strength to the steel deck by reason of the perfect adhesion of the wood to the steel, thus bringing in to use the strength of the wood as exemplified by the results of the following tests: A steel plate ⅜-inch thick, measuring approximately 44 inches by 24 inches, when subjected to end thrust, buckled at mid-length under a thrust load of 41.1 tons. A similar steel plate covered with a one-half inch layer of the sub-deck composition, upon which teak wood planks one inch thick, 3 inches wide and 44 inches long had been laid lengthwise and attached thereto by a one-eighth inch layer of the adhesive composition, was bound at its ends by angle irons bolted through the timber and steel and when subjected to end thrust, a maximum downward deflection at mid-length of 0.15 inch was registered at 80 tons end thrust. The steel plate buckled at mid-length at 84½ tons end thrust, when the middle part of the teak became detached from the composition which continued to adhere to the steel plate. A third specimen test piece consisted of a similar steel plate covered with a one-half inch layer of the sub-deck composition to which teak planks approximately 34 inches long, 3 inches wide and one inch thick were attached, using a one-eighth inch layer of the adhesive composition. This specimen was bound at its ends to angle irons bolted through the steel plate without the bolts passing through the timber and sub-deck composition. This specimen gave a maximum mid-length upward deflection of 0.13 inch at 90 tons end thrust. The steel plate buckled at mid-length under a load of 97½ tons. Until the steel plate buckled, the timber remained at-

[14] H. S. Rowan and Rowan & Boden, Ltd., 1938.

tached to the sub-deck composition which remained attached to the steel plate. It will thus be seen that the adhesion of the wood covering to the steel plate is so strong that, even when the steel under compression assumed a deflection of 0.13 inch in 24 inches, the whole remained completely homogeneous and the timber remained firmly fixed to the steel plate.

"The improved deck covering is economical to lay by reason of the fact that the wood planking does not require to be bolted to the steel deck plating and in consequence bolts or rivets are not necessary and the wood planks and steel deck plating do not require to be drilled for bolts or rivets. The improved deck covering is also economical to produce and of advantage in ship construction by reason of the saving in weight as compared with the ordinary 2½-inch thick wood deck. For example, a 2½-inch thick teak deck has a weight of approximately 94 lbs. per square yard, including all bolts as compared with approximately 70 lbs. per square yard for the improved deck covering using one-inch thick teak and a sub-deck layer having an average thickness of one-half inch. The improved deck covering also acts as a sound insulator and is therefore advantageous for covering decks over cabins and like passenger accommodation."

Apart from these major uses for adhesive purposes, a host of minor ones have developed and cement-latex adhesives find regular use in many industries for widely different purposes, such as wireless, cinema equipment, gramophones, scientific instruments, etc. A point which must be emphasized is that, although setting is fairly rapid, the strength of the bond is slow in developing. Consequently it is in many cases necessary to provide for the work scaffolding or shuttering which must not be taken away too soon. The bond must be allowed to form without any movement occurring. If it is allowed to break and is then re-formed, the strength is always very much less than that of a bond which has been allowed to form without any breaking or movement having taken place. Normally, however, any supports used may be removed within about 24 hours.

A further point to be emphasized is, although the adhesion is excellent for many purposes, it is less than that obtained with such other adhesives as synthetic resins.

Cement-latex adhesives have been suggested, for example, for use in aircraft, but the writer knows of no composition capable of giving the high adhesive strengths laid down in government and other specifications.

In line with their use as adhesives is the application which cement-latex compositions have received for waterproofing purposes. They make excellent damp-courses, especially for underground work. In London much trouble is experienced by water seeping into places below the ground level; in the Underground Railways cement-latex adhesives have been successful in preventing this percolation of water when all other remedies have failed, and they have also been applied for a similar purpose in the case of the underground cinemas which are found in many of London's main streets.

Another use which may be said to combine both the adhesive and waterproofing properties is for streamlining the hulls of ships. The streamlining consists in the application of cement-latex to fill the overlap of the ship's plates so that the surface presented to the water is perfectly smooth. Such a streamlining operation was carried out on the *Queen Mary* immediately prior to her record-breaking crossing of the Atlantic, and it is said to have contributed materially to this achievement. According to the press reports published at the time, the mix employed adhered strongly and was soon as hard as the steel plates themselves. Moreover it was claimed that barnacles and other marine animals will not grow on cement-latex compositions.

The main bulk of these compositions have so far been used for flooring purposes. Owing to their high cost—high in comparison with other materials—their use tends to be restricted to cases where their special properties are of sufficient value to justify them. For ships' floorings the cement-latex mix has tremendous advantages over the magnesite, magnesium oxichloride compositions, formerly used. Magnesite compositions attack steel and cause havoc by corrosion. To prevent this it is usual to coat the steel with a bitumen composition before applying the composition floor, and even this protection is not always successful, and corrosion is always liable to occur. Perhaps the chief advantage, however, is that of the reduction in weight which may amount to hundreds, or even thousands, of tons on a single vessel. Magnesite compositions had to be laid in a thickness of several inches and had a very high specific gravity. Cement-latex mixtures have a very low specific gravity and may be laid as thin as a ¼-inch and still be perfectly satisfactory. Moreover they are, as compared with bitumen compositions, unaffected by heat and cold. Even when not covered by carpets, linoleum, or rubber flooring, they are pleasant to walk on. When used in bathrooms, they are warm to the feet. Where decorative effects are required, it is necessary, as previously mentioned, to grind the surface after the composition has been applied and allowed to set. This grinding must not be done too soon, otherwise unsatisfactory results are obtained. The choice of grinder is also important as unsuitable tools may give bad results and even pull out bodily small pieces of decorative materials, marble chippings, cork, etc., that have been used. By far the largest application of cement-latex mixtures has been on ships where its advantages are outstanding, and many of the largest ships now under construction in English and other European yards will have cement-latex floors.

Nevertheless certain other uses are worthy of mention. The beautiful decorative effects obtainable make the composition very suitable for table tops, bar counters, etc. After the grinding operation the surface may be treated with a cellulose or other finish, and in this way a surface which is very attractive and easily cleaned is produced. A further development is for the lining of swimming pools, both on board ship and on land. The warm feel and outstanding water-holding qualities are very great advantages, together with the fact that any desired color may be produced. Mineral colors are used chiefly, but they should not contain soluble copper or manganese compounds.

Another interesting application is flooring cow-stalls. The material is warm, not requiring a straw covering, is easy to keep clean, and eliminates injury to the animal such as may occur on concrete. No doubt only the high cost of cement-latex floorings has prevented their wider use. In line with its use for cow-sheds, mixes have been devised for other animals. The dens for the lions, bears, tigers, etc., at the London Zoo are of cement-latex mixture which the zoo authorities adopted as the most suitable material so far produced and vastly superior to any other for keeping the animals in good condition.

The consumption of latex for these purposes has no doubt received a setback by the recent heavy increase in the premium for latex as compared with the price of raw rubber. It is to be hoped, however, that this will soon be brought to a more normal figure so that the expansion in the application of this type of composition will be enabled to continue at an increasing rate.

Preventing Fires in Rubber Processes

G. M. Burke[1]

THE fire loss record of rubber occupancies in manufacturing plants compares favorably with that of other industrial classifications. The use of flammable liquids in many rubber working processes introduces serious hazards; yet these and other hazards have been generally recognized, and the industry has done excellent work in seeing that adequate safeguards have been provided. A recent study by The Associated Factory Mutual Fire Insurance Cos., covering 193 reported fires in rubber occupancies over a five-year period, shows that 143 occurred in manufacturing processes except driers, 32 in driers, and 18 in storage occupancies.

CAUSES AND DAMAGE IN 193 RUBBER PLANT FIRES (1935-1939)
Manufacturing Processes (except Driers and Ovens)

Causes	% of Number of Fires	% of Amount of Damage	Average Damage
Electrical	25.39	11.71	$198.20
Static sparks	19.69	3.76	82.02
Friction	12.96	4.43	147.02
Spontaneous ignition	5.70	2.93	221.18
Cutting and welding	5.70	3.70	278.61
Hot steam pipes	1.03	2.02	838.78
Smoking	1.03	1.12	466.21
Molten metal	.52	.14	112.23
Lightning	.52	.04	33.38
Overheating	.52	.03	21.60
Not determined	1.03	.20	84.69
All manufacturing processes	74.09	30.08	$174.46
Driers and Ovens			
Spontaneous ignition	5.70	4.28	322.46
Overheating	4.14	2.46	254.80
Hot pipes or ducts	4.14	5.44	564.18
Gas burners	.52	.37	308.33
Electrical—motors	.52	.11	90.39
Static sparks	.52	.03	26.29
Smoking	.52	.17	138.81
Cutting and welding	.52	.68	561.62
All driers and ovens	16.58	13.54	$350.76
Storage			
Spontaneous ignition	2.07	1.76	$364.88
Smoking	1.56	2.44	675.88
Exposure	1.56	17.76	4,908.66
Hot steam pipes	1.04	1.95	810.74
Electrical	1.03	.38	157.50
Spark from locomotive	.52	30.77	25,513.92
Acetylene torch	.52	1.18	975.84
Not determined	1.03	.14	57.03
All storage	9.33	56.38	$2,597.41
All causes	100.00	100.00	$429.67

Specific Fire Causes and Preventive Measures

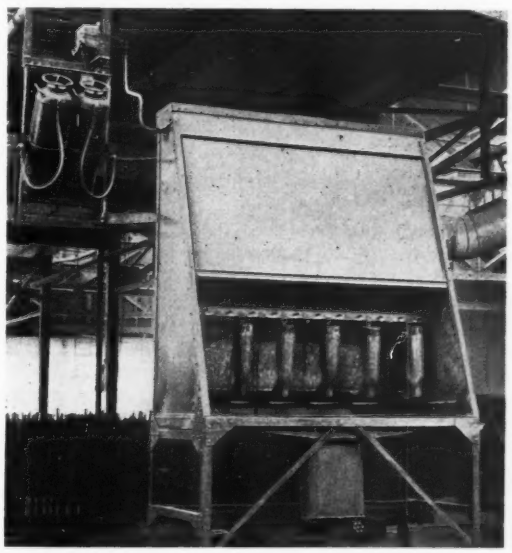
Electricity stands first as a cause of those fires which involved manufacturing. Of 49 fires of electrical origin 17 started at motors, 14 at switches, 11 in wiring, and seven at other points. Fires of this kind can be largely prevented if the electrical equipment is installed in accordance with the requirements of the National Electrical Code and if, after installation, it is periodically inspected and carefully maintained.

In rubber plants there is usually a large amount of electrical energy released when short circuits occur so that the intensity of an arc and the amount of damage done are likely to be severe.

Large quantities of dust are also found in certain parts of rubber mills. Even though dry, this dust may have a harmful effect on electrical equipment. It may settle on windings and obstruct ducts to such an extent that the ventilation and cooling of apparatus may be affected. If electrical equipment operates at excessive temperature, the insulation is liable to be affected harmfully and breakdown may occur sooner than would be true under usual conditions. If the dust becomes mixed with oil, the insulation is liable to deteriorate rapidly.

Motor starters, controllers, overload protective devices, and similar equipment in dusty locations should be enclosed in dust-tight cabinets or located in separate rooms kept under slight pressure by clean air blowers, a method employed to good advantage by several rubber manufacturing plants. Placing the electrical equipment for Banbury mixers in separate rooms is especially desirable because of the carbon black used. Carbon black settles on the insulation of motor windings and produces a conducting surface, and further harmful effects result if oil becomes mixed with the deposit.

Ample Fire Extinguishers Should Be Available in All Departments so That Employes Can Attack Fires Quickly When They Break Out

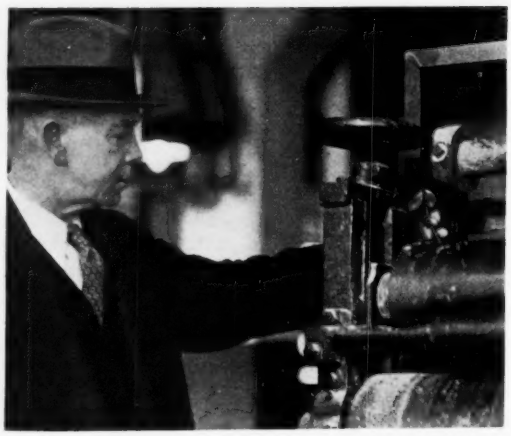


Varnishing Process Safeguards: in the Hood over the Varnish Dipping Tank Are Heat Actuated Devices Which, in Case of Fire, Operate the Automatic Foam Extinguishers at Upper Left so That They Discharge through Foam Heads over the Tank; Melting of a Fusible Link Would Drop the Hood Cover, and a Quick-opening Valve at Floor Level Would Enable Quick Dumping of the Tank Contents into a Safely Located Salvage Tank

[1] Inspector, Associated Factory Mutual Fire Insurance Cos., 184 High St., Boston, Mass.

Dusty conditions have been considerably reduced in recent years by providing dust-collecting hoods and duct systems where dust is likely to be present in large quantities in working areas. Depending upon conditions, motors should be blown out at intervals, and they should be taken down and given a special cleaning, usually about once a year. Large mill motors set in pits should receive special attention as oil from the bearings frequently gets on to the windings and collects in the pits. It is advisable to have all electrical equipment inspected regularly, particularly rotating equipment and control and overload protective equipment having moving parts. The setting of the overload protective devices should be examined periodically as it is very desirable that this type of apparatus function promptly if overloads or short circuits occur.

An Explosion in This Balata Purification Building, Which Housed Processes Utilizing Large Quantities of Flammable Liquids, Showed the Value of Detached Buildings for Extra-hazardous Processes and the Avoidance of Damage to Adjacent Valuable Structures



Ground Connections to Neutralize Static Charges on Spreaders and Similar Equipment Involving Flammable Vapors Should Be Tested Frequently

Grouping of combustible covered or lead sheathed cables, as behind switchboards, in manholes, and in junction boxes, should be avoided, for a breakdown of insulation is liable to result in ignition of the insulation and spread fire to all cables in the group. Such cables can be protected by providing an outer non-combustible wrapping consisting of asbestos tape, about $\frac{1}{16}$-inch thick and two inches wide. It should be laid on with a 50% lap and, after it is on, should be saturated with a 1.15 specific gravity solution of silicate of soda.

Portable lamps cause frequent fires as a result of breakdowns in cords and sockets and breakage of bulbs. Cords should be of the hard service type, with substantial guards over the lamps and sockets. The portables should be inspected frequently so that weak points may be detected before breakdown occurs.

Old electrical equipment is a special source of danger. It should be carefully observed; the natural end of all electrical equipment is breakdown and possible fire, and old equipment should be replaced before trouble develops.

Static sparks also start many fires in rubber plants. They can be prevented by grounding all moving parts of machines to the frames, and the frames to the sprinkler piping. This is important at tire building machines, spreaders, or similar equipment where flammable liquids are used. Static charges on operators can be largely prevented by providing grounded non-ferrous metal mats and prohibiting rubber-soled shoes. On tire building machines floor switches should be grounded to the machines. Static eliminators help to reduce charges on belts, shafting, and cloth passing through spreaders. Hand cementing tables should have grounded metal tops. Hard-rubber grinders, cornstarch-dusting machines, sifters, and screens handling combustible dust should also be carefully grounded.

Static charges may also develop when flammable liquids are transferred from one container to another, or from the outlet of a piped system to a container; such charges can be prevented by a ground cable between the containers or between the outlet and the container. Automatic humidifying equipment which will maintain a relative humidity of at least 40%, or preferably 50%, is another positive aid in reducing the probability of static fires. Such equipment is practical in relatively small areas such as spreader rooms and cement mixing rooms, but not for large areas such as those where tire or shoe manufacturing operations are usually carried on.

Since fires caused by static sparks usually occur where flammable vapors are present, ample positive ventilation is imperative in spreaders, spreader rooms, cement and varnish mixing rooms, near large or numerous dip tanks, and wherever appreciable quantities of flammable vapors are given off. As these vapors are heavier than air, it is important that room ventilation be taken from near the floor level, with fresh-air inlets near the ceiling. Electrical equipment in such locations should be of types approved for use in hazardous areas. Methods of handling the flammable liquids are also important: the quantity exposed should be kept at a minimum; equipment and containers should be kept closed where practical; and main storage tanks should be buried outside buildings.

Friction was the cause of 25 fires, of which 14 occurred in buffing and grinding operations. The fine rubber dust is hot when it leaves the buffing wheels. If not allowed to cool before reaching the collector, it will continue to heat and eventually ignite spontaneously. Ducts should be long enough to permit the dust to cool before it reaches the collectors; there should be no dead spots where accumulations can collect; and care should be taken to prevent sparks from entering the system. Open sprinklers turned on by hand afford good protection for the inaccessible interiors of ducts.

The other 11 friction fires occurred at power drives, hot bearings, or machine parts and could have been prevented by more careful maintenance or better housekeeping.

Eleven of the remaining fires in manufacturing areas were caused by spontaneous ignition in accumulations of waste or deposits of residue and could have been prevented by higher standards of cleanliness.

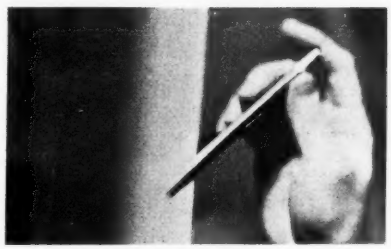
Fires caused by cutting and welding operations, hot steam pipes in contact with combustible materials, and careless smoking occur in all classes of plants and can be prevented by continuous education and improved supervision of employes and operations. The use of a cutting and welding permit card system or its equivalent is

now well organized in a large number of plants and has proved an effective method of assuring the safe use of the portable equipment.

Of the 32 fires occurring in driers or vulcanizers, 11 resulted from spontaneous ignition, eight from overheating, eight from combustible material in contact with hot pipes or ducts, and one each by gas burners, electrical equipment, static sparks, smoking, and cutting and welding. This class of fire can easily be prevented by using care in the type of material placed in a drier; by keeping the driers, heaters, and ducts free of accumulations of dust, waste material, and deposits; and by insulating steam pipes and ducts near combustible construction in the driers or buildings. Reclaimed rubber driers and heating ducts particularly should be kept clean as stock should not be permitted to accumulate in out-of-the-way corners, and care should be taken to prevent overheating.

The 18 fires in storage areas resulted from usual causes such as spontaneous ignition in scrap or reclaimed rubber, smoking, combustible materials in contact with steam pipes, exposure fires, electrical causes, sparks from locomotives, and cutting and welding. Fires in the storage of scrap rubber (old tires and tubes, mechanical goods, friction scrap, trimmings, etc.) are usually burrowing fires which are hard to extinguish, and more than ordinary care should be used to protect such storage from all sources of ignition. Large quantities of scrap rubber should not be stored in buildings having any combustible construction. Storage in buildings should be under complete sprinkler protection in piles not over six feet high and subdivided at least every 20 feet by aisleways; in plant yards, storage should be in moderate sized piles separated by aisleways at least as wide as the piles are high. An adequate number of fully equipped hydrants or monitor nozzles are the recommended protection for outdoor storage.

Good Maintenance Includes Periodic Testing of Safety Containers for Leaks



A Neon Pencil Provides a Convenient Means of Testing for Static Electricity; but to Avoid Sparks from Charges Carried by the User the Instrument Should Be Grounded Frequently in a Non-hazardous Area

General Principles of Fire Protection

Experience has developed certain well-recognized principles for the control of fire hazards and for methods of fighting fires in rubber plants. The proper isolation of hazardous processes is of primary importance; they should be located either in detached non-combustible buildings, or on ground floors, and separated from other occupancies by fire walls. Sprinklers are needed wherever there is anything combustible in building construction or contents, as this protection is automatic and has proved to be the most reliable single factor in preventing serious fires with their consequent interruption to production.

For the quick handling of fires by employes adequate fire extinguishers of types suitable to the various hazards should be provided, with the men in each department thoroughly trained to use them properly. In areas where ordinary combustibles such as fabrics, packing materials, and finished goods are being processed or stored, soda-acid or the various plain water types of extinguishers are suitable. Vaporizing liquid or carbon dioxide extinguishers are advisable in power houses, in switch rooms, and near all important electrical equipment such as motors at Banbury mixers or mill-line drives.

Flammable liquid occupancies require careful study to determine the types of extinguishers best suited to the conditions. Automatic carbon dioxide or foam systems piped to rubber cement mixing churns are advisable in the larger and more important installations. Automatic foam systems in addition to the usual automatic covers should be provided for open cement dip tanks. Manual extinguishers of the carbon dioxide and foam types, of sizes adequate to the particular conditions, are necessary for quick use in cement mixing rooms, near spreaders and impregnating machines, at cement and shoe varnish dip tanks, near hand spreading operations, at tire building machines, and in other locations where flammable liquids are used.

Talc, commonly available in all rubber plants, is a good extinguishing agent for fires which can be readily blanketed, as in spilled liquids on flat surfaces or in oily drive pits.

Fires in accumulations of light combustible materials such as cotton flock, buffings, hard rubber dust, and ground soft rubber are well handled by hose streams equipped with spray nozzles which will cover the burning area with a fine water spray, extinguishing the fire on the surface without unduly disturbing the material, after which any burrowing fire can be uncovered and extinguished.

As a supplement to automatic sprinklers, hose streams are particularly needed for handling fires in stored rubber, whether crude, reclaimed, or scrap. Water, and plenty of it, is the best extinguishing agent for this type of storage. Fires in large outdoor storages of scrap rubber burrow into the pile and must be dug out while large quantities of water are being continuously applied.

Company Organization for Fighting Fires

Any fire must be attacked promptly when it breaks out. It is good practice to instruct employes thoroughly not only in carefulness in preventing fire, but also in the proper action to be taken when fires break out. As the first few minutes are the most important, reliance should not be placed wholly on the public fire department, which, furthermore, is not so familiar with particular plant conditions and hazards as the employes themselves.

In all plants, large or small, effective organization of employes at the point where fire might break out gives

(*Continued on page* 49)

Effect of the War on Germany's Rubber Goods Markets

L. Thakar

AT THE Leipzig Spring Fair held March 3-11, 1940, the foreign participation consisted of exhibits from 15 different countries: Italy, Japan, Yugoslavia, Netherlands, Belgium, Greece, Bulgaria, Latvia, Luxemburg, Esthonia, Rumania, Slovakia, Hungary, Sweden, Switzerland. These countries practically define the present limits within which German foreign business has been confined by the war and the blockade. Even within these territories the blockade effectively curbs Germany's opportunities for business and does this with particular thoroughness for her export trade in rubber goods by excluding supplies of natural rubber.

What was the extent of this trade and what new developments may be looked for in Germany's former markets?

In 1938, Germany exported 170,378 quintals (approximately 17,000 tons) of rubber goods, value 42,937,000 marks, representing a decrease of about 10% in quantity and value as compared with the totals of 1937. But in the first half of 1939, the latest period for which figures are available, exports showed a marked recovery, a recovery which probably was at least partly due to the inclusion of exports from what was formerly Austria. In that period the exports were 119,903 quintals, value 26,920,000 marks.

Both by volume and value, unspecified soft rubber goods (which include the novelties and specialties for which Germany was well known) constituted the most important exports; next came elastic goods, automobile tires, hard rubber goods, and hose. German rubber goods found their way in smaller or larger quantities to practically every part of the world; but Europe, and more particularly the western states of Europe, may be said to have been the backbone of German foreign trade in rubber goods. Over 50% was sold in Europe; the main European outlets were the Scandinavian countries, Netherlands, Belgium, and Great Britain. A wide variety of goods, although in far smaller amounts, also went to the Balkan states.

The trade to South America was not on an equality with that to the European states, but in the aggregate, and compared with the total volume of German rubber exports, a fairly good business was done, especially in certain lines as: belting, unspecified soft rubber goods. tires, shoes, and rubber thread. For instance, Brazil ranked with Yugoslavia as the chief consumer of German rubber thread.

The chief markets outside of Europe were in Asia, with British India far in the lead; while Netherland India followed. On a limited scale Malaya, Ceylon, Burma, and the Union of South Africa also figured among the regular importers of German rubber goods.

The total values and quantities of the chief lines of goods exported by Germany in the first half of 1939, and, in the order of their importance, the largest buyers for a given line are shown in the table below. The percentages in brackets indicate the share of the respective countries in the total quantity of each article shipped.

Rubber Manufacturing in Europe and the Blockade

Now practically all of Germany's customers of any importance have more or less well-developed rubber industries of their own. As regards Europe, we find Belgium, for instance, is not only a most efficient producer of rubber goods, but is also an exporter, particularly of tires. The Netherlands rubber industry, on the other hand, manufactures chiefly for home consumption. The Scandinavian countries, which have had an export trade in rubber footwear, had begun to expand tire production; comparatively recently there have been large-scale modernizations of existing factories and also new additions, in most cases financed by American capital. In the Balkans, Hungary is a manufacturer of various specialties including rubber toys; in Rumania, tire manufacturing was started not long ago by a rather large concern in which American capital is interested, and other smaller factories also are in operation. And so we could go on.

With Germany practically eliminated as a supplier of rubber goods to these countries, it would appear logical that these countries will take the opportunity to expand home production to the utmost, especially in those lines where progress was hitherto retarded by the pressure of German competition. Under present conditions, however, there is always the possibility that the blockade may affect supplies of raw rubber to European neutrals, and naturally any reduction in these supplies as compared with pre-war shipments would check expansion plans. This being the situation, it would appear that countries able to export

German Exports of Rubber Goods in the First Half of 1939

	Quantity	Value Marks	Chief Customers		
Substitute ..... *quintals*	2,214	173,000	Denmark (12%)	Hungary (12%)	Switzerland (10%)
Solution ..... *quintals*	1,808	208,000	Netherlands (40%)	Belgium (18%)	Switzerland, (7%)
Thread ..... *quintals*	1,009	363,000	Yugoslavia (14%)	Brazil (14%)	France (8%) Sweden (8%)
Automobile tubes ..... *number*	130,752	350,000	Denmark (22%)	British India (11½%)	Sweden (7%) Netherlands (7%)
Tires ..... *number*	169,671	4,026,000	Denmark (18%)	Brazil (10½%)	British India (10%)
Cycle tubes ..... *number*	1,122,741	470,000	British India (42%)	Netherland India (8½%)	Denmark (7%)
Hose ..... *quintals*	8,868	1,967,000	Netherlands (16%)	Sweden (12½%)	British India (11%)
Belting ..... *quintals*	2,266	719,000	Bulgaria (11½%)	Yugoslavia (9%)	British India (6%)
Footwear ..... *pairs*	134,879	245,000	Sweden (14%)	Belgium (12%)	Netherlands (12%)
Other soft rubber goods.. *quintals*	40,874	9,337,000	Great Britain (20%)	Netherland India (12½%)	British India (10%)
Elastic goods ..... *quintals*	11,668	4,181,000	Netherlands (12½%)	Sweden (9%)	Great Britain (9%)
Hard rubber goods..... *quintals*	5,665	2,421,000	Switzerland (16%)	Netherlands (10%)	Norway (7¼%) Great Britain (7½%) British India (7½%)

the necessary rubber goods would be in a particularly favorable position to benefit by Germany's absence from these markets.

The Overseas Markets

Turning now to the overseas markets we find the situation is quite different. On the one hand, Germany is completely cut off from them; on the other they have ready access to the raw rubber they need for their growing young industries. The thriving industries in Brazil and Argentina will probably be able to make up most of the former imports of rubber goods from Germany. In South America there is increasing activity in rubber manufacturing. Brazil, for instance, has quadrupled her consumption of crude rubber in the short space of five years; in 1934 she used 1,045 tons of rubber, and in 1939, 4,065 tons.

The enterprise of large concerns from the United States is contributing toward making various South American countries self-sufficient especially in respect to tires and rubber footwear. Only recently two leading United States rubber firms announced plans to erect new factories to produce these goods.

Markets in Asia

The chief markets in Asia present a somewhat similar picture. The ubiquitous Bata has established rubber footwear factories and stores in India and Malaya, rendering these countries practically independent of imports. Large English and American tire factories are established in India and already supply at least half of local consumption. Up to 1937 India's consumption of raw rubber advanced at an even more rapid rate than that of Brazil. In five years (from 1932 to 1937) the amount of rubber used grew from 137 to 7,172 long tons. There was a recession in 1938 to 5,610 tons, but figures for the first nine months of 1939 were 4,820 long tons, which points to a certain recovery.

Despite greater productive capacity India's total tire imports increased for the first half of 1939. Automobile tires came to 127,206 units, against 99,530 units in the first half of 1938. Most of these tires were supplied by Great Britain, but we note Germany's share (as shown in German statistics) though relatively small, increased about 70%, or from 8,904 units in the first six months of 1938 to 15,537 units in the corresponding period of 1939. The increase in German shipments of cycle tubes was more spectacular. India's total imports of these goods in the first six months of 1939 were 770,585 units in comparison with 534,568 units for the same interval in 1938. Of these, the figures indicate German shipments to India of 459,039 against 158,394 cycle tubes, so that it would appear that Germany not only accounted for the entire increase in the imports of these goods, but even encroached on the trade that had been enjoyed by other exporters.

However, this spurt in Germany's tire and tube exports seems to have been related to her efforts to obtain foreign currency in important raw material markets, and sales were no doubt made at "sacrifice" prices.

On the whole, figures reveal that Germany was not so important to India as a source of rubber manufactures as the latter country was to Germany as a market for these goods, for outside of sundries, toys, heels, and soles, which came mainly from Germany and Japan, the greater part of the other rubber wares was supplied by Great Britain.

American consular reports indicate that the United States has an opportunity to supply some of the tires and surgical goods Germany formerly sent, but the market for most sundries, toys, heels, and soles will probably be divided between local producers and Japan.

Conditions in Java

The market in Java is much more limited than that of India, and local production is narrowing the import field. A decade or so ago various small rubber factories sprang up in Java, but nothing much was accomplished until Goodyear established a tire factory in Buitenzorg. Since then the country has become an exporter of tires and tubes. A certain amount of these goods is still imported, but the quantity has been decreasing steadily. The comparatively high German shipments of cycle tubes in the first half of 1939 (92,446 units against 10,929 in the similar period of 1938) have been rather surprising. Here too the need of currency dictating extra-low prices may perhaps be the reason for the unusual increase.

British Aims

It may perhaps be fitting to conclude this survey by recalling that Great Britain has been impressing on her nationals that "Exports are England's Fourth War Arm," and that she has begun a widespread campaign to expand exports. Redoubled efforts on the part of the British to capture Germany's lost markets may therefore be looked for.

Rubber Drum Protectors for A.R.P.

Rubber ear caps are now being made to protect wearers against certain war gases which, if allowed to penetrate the inner ear, would make decontamination extremely difficult. It is also claimed that, though the caps will not prevent the hearing of normal conversation, they will protect the ear drum from blast. These ingenious rubber A.R.P. devices are light in weight, comfortable to wear, and not unattractive in appearance as they are made of flesh-colored rubber. It is claimed that they can be carried in the same container as the gas mask and are slipped over the ears before the mask is put on. They are made in three sizes: men, women, and children; and they may be easily decontaminated by washing in hot, soapy water.

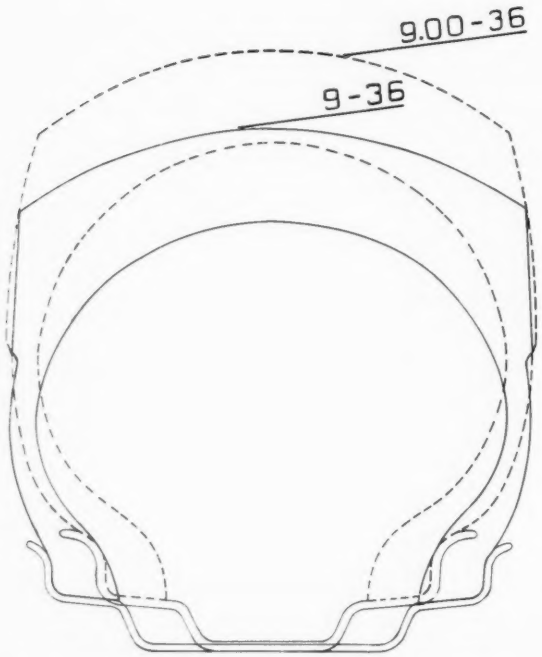
Metal Forming with Rubber

The Cleveland Crane & Engineering Co., Wickliffe, O., informs us that rubber is being used with its new J-12 Steelweld bending press in the bending and forming of light metal sheets. In the new method a hard upper die forces the metal sheet into a lower trough filled with sheets of rubber. The compressible rubber sheets serve in place of the usual female die. Owing to the elastic deformability of the rubber, the metal sheet becomes formed, as the press closes, in exact accordance with the contour of the male die. This new development in metal forming, which is being used principally in aircraft manufacture, not only eliminates the use of an expensive female die, but is also said to prevent die markings on the plate.

The new J-12 press will handle plate up to 12 feet by 5/16-inch between housings and up to 14 feet over total length of bed and ram.

Wide Base Tractor Tires[1]

R. P. Gaylord[2]



Cross-Sectional Sketch: Solid Lines Designate the New Wide Base Tire; Broken Lines Show a Corresponding Conventional Tire

THE development of wide base tires, which have been adopted by nearly all tractor manufacturers during the past year, has been aimed at reducing tire prices as the rubber industry's contribution toward lower tractor costs.

The accompanying sketch shows the basic difference between the conventional and the wide base tire. It should be noted that both have the same sectional diameter and the same rim diameter. As these two dimensions are normally used to indicate tire size, the two tires are of the same size under the present system of tire measurement. Normally tires are designated by the sectional diameter in hundredths of an inch and the rim diameter in even inches, for example, 8.25-36 and 9.00-36. The new wide base sizes are designed so as to eliminate sections with fractional dimensions. Thus, these tires are designated by having both sectional diameter and rim diameter in whole inches, for example, 8-36, 9-36, and 10-36.

An endeavor was made to hold to a minimum the total number of sizes for this new type of tire. The number of sectional diameters was limited to eight: namely, 6, 7, 8, 9, 10, 11, 13, and 15. It was hoped that the rim diameters could be limited to four or five sizes, but already there are eight different rim sizes: 24, 26, 28, 32, 36, 38, 40, and 42. There are now 20 tire sizes being manufactured, and it is expected that there will be others.

The actual differences between the new wide base tire and the old conventional tire may be seen in the sketch. The rims are much wider in the wide base tire, and the tire is of a different shape. Conventional tires use rim widths of from 50 to 80% of their sectional diameters; while the wide base tires use an 82 to 86% rim width ratio. To aid in simplification, the new tires were designed so that the required rim is always one inch narrower than the tire. Thus a 10-36 tire uses a nine-inch rim and a 9-36 tire uses an eight-inch rim. Also, the rims are so designed that the wells are the same depth.

A most important factor is the reduced outside diameter of the wide base tire, resulting from the new shape. The widening of the rim and the reduction in outside diameter have resulted in a saving of rubber and cotton which has lowered tire costs to the tractor manufacturer by approximately 15%. Experiments have been made with even more radical tire shapes, but indications are that the present wide base tire approaches the limit of successful shape variation.

[1] Abstracted from paper presented before the University of California Farm Machinery Conference, Jan. 12, 1940.
[2] Goodyear Tire & Rubber Co.

Crepe Sole Rubber Imports Dutiable[1]

A RECENT decision by the United States Department of the Treasury, Treasury Decision 50020, states, "Crepe sole rubber, in the form of sheets, plain or corrugated on one side, colored or uncolored, prepared to a definite thickness as a single sheet or by the lamination of several thin sheets to a definite thickness, whether or not cut into soles for shoes, is dutiable at the rate of 20% ad valorem under paragraph 1558, Tariff Act of 1930, rather than free of duty as crude rubber under paragraph 1697 of the tariff act. As this ruling results in the assessment of duty on such merchandise at a rate higher than heretofore assessed under a uniform practice, it should be applied only when the merchandise is entered for consumption or withdrawn from warehouse for consumption after 30 days after this abstract is published in the weekly *Treasury Decisions*. Department letter to collector of customs, New York, N. Y., dated November 21, 1939 (465.224)."

The amount of world trade in sole crepe rubber, which has heretofore been classified as crude rubber in trade and statistical practice, is not definitely known. During the first ten months of 1939, Malayan sole crepe rubber exports amounted to 1,423 long tons, distributed as follows: United Kingdom, 830; Canada, 160; United States, 131; Philippine Islands, 66; France, 51; New Zealand, 47; Czechoslovakia, 36; Germany, 32; Italy, 19; China, 11; Belgium, 7; Sweden, 5; Egypt, 5; others 23. During the first two months of 1940, arrivals of sole crepe rubber in the United States, dutiable under T.D. 50020, were all from Netherland India, amounting to 363 long tons, and these particular arrivals have not been included with crude rubber in the official import statistics, as was formerly the practice. Ceylon has also been a source of sole crepe rubber.

Except in Germany and Egypt, where all crude rubber imports are dutiable, and now in the United States, imports of sole crepe rubber are free of duty upon entry into world markets, so far as known. Manufacturers in these markets will therefore have an advantage over American firms in costs of this material, to the extent of the 20% duty.

[1] Abstracted from *Rubber News Letter*, Mar. 15, 1940.

German Patents Relating to Synthetic Rubber-like Materials—II[1]

Law Voge[2]

THE introduction of organometallic compounds as polymerization agents began with the January 27, 1912, patent application[3] of the Badische Anilin und Soda Fabrik, the claim of which reads: "Butadiene, its homologs, analogs or their mixtures caused to react with organometallic compounds, especially alkyl compounds of the alkali, earth alkali or magnesium metals for polymerization." *Example:* Isoprene, 20 parts, zinc sodium ethyl, four to five parts, in sealed tube with exclusion of air and shaken or stirred. After a few hours the volume becomes considerably decreased, and thickening of the mass occurs. After this has attained its maximum the process proceeds as usual.

New initial materials for synthetic rubber are introduced in the January 31, 1912, patent application[4] of Dr. Otto Roehm, of Darmstadt: namely, acrylic acid esters ($C_3H_3O_2$– compounds). The claim covers the polymerization of these esters and subjecting the products to regular rubber vulcanization processes. Acrylic acid esters are said to be cheaper than isoprene. No example is given. This is not truly a synthetic rubber as the final product apparently contains oxygen.

The application of the viscous liquid emulsification process of patent No. 254,672[5] is applied by Farbenfabr. vorm. Fr. Bayer & Co. to erythrene and the other isoprene homologs in a patent[6] applied for on March 13, 1912. The claim reads: emulsifying with and polymerizing in viscous liquids, of butadiene series compounds. *Example:* Blood serum, 200 parts, diluted with water, 300 parts, and sealed in a vessel with liquified erythrene, 200 parts, and shaken for a considerable time at incubator temperature.

The use of a higher temperature with automatically increased pressure is the subject of another patent application[7] by Bayer on March 15, 1912, the claim of which specifies heating the Kondakow product to 150 to 200° C. under automatically increased pressure. The initial material, beta-gamma-dimethylerythrene, is heated in a closed cylindrical iron vessel at the temperature given for eight hours; the pressure automatically increases as the process develops.

Tanning agents as substitutes for alkalies in the basic Bayer process[8] are proposed in the application[9] of May 26, 1912; the claim covers this general statement. *Example:* Kondakow product, 100 parts, tannin, six parts, mixed and worked up to thin sheets on the rolls. The products are stable in air. These, too, cannot be considered true synthetic rubbers as the final products probably retain oxygen from the tannin, though in small amounts.

Another Bayer patent[10] applied for May 26, 1912, applies the same tanning agent to the process of patent No. 264,820.[11]

The substitution of a small percentage of natural rubber for alkaline reagent is also covered by application[12] on the same date by Bayer; the claim specifies this general statement. *Example:* Kondakow product, 100 parts, Para rubber, five parts, in the form of an initial sheet and intimately mixed on the rolls.

The combination of colloidal metal and heating as polymerization means is the subject of application[13] by the Bayer company on July 21, 1912; the claim reads: exposure of butadiene, its homologs, or analogs to the action of colloidal metals. *Example:* Water, 100 parts, in which is dissolved colloidal mercury, one part, and the solution shaken with isoprene, 100 parts, with gentle heating. After a time the isoprene becomes transformed into rubber.

The use of peroxides or "ozonides" to improve the quality of already formed synthetic rubber was covered in the application[14] by the Badische Anilin Fabrik of August 3, 1912. The claim covers treating polymerized butadiene or homologous products with organic peroxides or ozonides. *Example:* "Sodium rubber" (isoprene synthesized with metallic sodium), 100 parts, added to benzene, 100 parts, and terpene ozonide, five parts, is heated in a sealed vessel at about 100° C. for some days. By treating the product with steam the rubber-like material remains.

Sodium polymerization in an atmosphere of carbon dioxide forms the subject of the next application,[15] again of Badische Anilin Fabrik., on September 4, 1912. The purpose is not merely to accelerate the reaction, but to form distinct products. The claim reads: "Treatment of butadiene and its homologs with metals such as sodium in the presence of CO_2 until the mass is almost insoluble in benzene." *Example:* 2,3-dimethyl-1,3 butadiene, 100 parts, and sodium wire, five parts, placed in a closed vessel filled with dry CO_2 gas and shaken at ordinary temperature for two or three days. After this time the sodium becomes broken into small pieces and begins to swell. After three or four more days all of the butadiene has become a swollen black mass without first becoming a viscous liquid.

The use of vacuum and nitrogen atmosphere in sequence for the treatment of synthetic rubber to improve its properties formed the subject of patent application[16] of Badische on November 2, 1912. The claim specifies heating butadiene polymerization products under reduced pressure, with or without inert gas atmosphere and in the presence of nitrogen compounds, (NH_3), etc. *Example:* Dry isoprene polymerization product[8] heated in a nickel vessel in an oil bath with a vacuum of 40 millimeters at 140° C. for five hours and then three to four hours at 140 to 160° C. A current of ammonia gas is passed through the mass from the beginning to the chilling. The product can be worked on warm rolls.

Substituting for part of the metallic sodium, a quantity of the crude product of polymerization was covered in a Badische application[17] of November 7, 1912. The claim

[1] Continued from our Apr. 1, 1940, issue, pp. 48-50.
[2] Research chemist and engineer, Washington, D. C.
[3] No. 255,786, Jan. 20, 1913.
[4] No. 262,707, July 14, 1913.
[5] See INDIA RUBBER WORLD, Apr. 1, 1932, p. 50.
[6] No. 255,129, Dec. 20, 1912.
[7] No. 254,868, Dec. 18, 1912.
[8] See INDIA RUBBER WORLD, Apr. 1, 1940, p. 49.
[9] No. 259,722, May 10, 1913.
[10] No. 266,153, Oct. 17, 1913.
[11] See INDIA RUBBER WORLD, Apr. 1, 1940, p. 50.
[12] No. 273,708, May 4, 1914; supplement to No. 250,920.
[13] No. 264,959, Sept. 24, 1913.
[14] No. 265,325, Oct. 3, 1913.
[15] No. 287,787, Oct. 5, 1915.
[16] No. 271,849, Mar. 19, 1914.
[17] No. 294,816, June 29, 1917.

reads: "Preparing greater amounts of rubberlike substance by using, in place of metal, the first darkly covered product formed in the process of patent No. 287,787." *Example:* The black polymerization product of patent No. 287,787,[15] 100 parts, covered with dimethylbutadiene, 500 parts, and allowed to stand in a carbon dioxide atmosphere some time till the liquid disappears.

The use of piperidine or its homologs as vulcanization accelerator for butadiene rubber forms the application of a Bayer patent[18] of November 16, 1912; the claim merely makes this general statement. *Example:* Beta-gamma-dimethylbutadiene rubber, 100 parts, sulphur, 10 parts, piperidine, one part, vulcanized for one hour at 120 to 125° C. at a pressure of 2¼ atmospheres.

The application of this process with piperidine to the vulcanization of Kondakow polymerization products of patent No. 255,680[19] was proposed by Bayer on November 16, 1912.[20] *Example:* Kondakow polymerization product, 100 parts, piperidine, 0.75-part, mixed on the rolls, adding simultaneously or previously sulphur, 25 parts. The mass is then heated to 160 to 165° C. for two hours. With 10 parts, instead of 25 parts of sulphur, a good product is also obtained.

The use of inert gas and a nitrogen compound without vacuum was claimed on December 4, 1912,[21] by Badische for the treatment of synthetic rubber. The claim reads: "Heating polymerized butadiene products under ordinary or increased pressure with exclusion of air and use of inert gas and in the presence of nitrogen compounds." The patent asserts that it differs from the Bayer British patent No. 17,734 of 1910 as there volatile products, such as isoprene and benzene, were present.

The combination of alkali and non-alkali metals as polymerization accelerators, applied to the process of patent No. 287,787,[15] was claimed on December 10, 1912,[22] by the Badische company. The claim specifies: "A form of execution of patent 287,787 characterized in that mixtures or alloys of alkali metals, themselves or in combination with other metals." *Example:* 2,3-dimethyl-1,3 butadiene, 100 parts, fine sodium wire, five parts, iron filings, five parts. In a carbon dioxide-filled vessel and shaken for three or four days till the mass is transformed to a black, voluminous product. It is freed from alkali metal, etc., by placing in water, alcohol, etc. The iron residue is finally removed with HCl. Zinc, tin, lead, nickel, etc., can replace iron.

Substituting derivatives of the bases for piperidine and its homologs as vulcanization accelerators was claimed by Bayer on December 25, 1912.[23] *Example:* Dimethylbutadiene, 100 parts, sulphur, 50 parts, monopiperidylurea, one part, vulcanized at 155° C. and five to six atmospheres pressure. The product is a fine hard rubber.

The purpose of the next patent,[24] applied for by Bayer on December 25, 1912, was to reduce the time and the temperature required for the process of patent No. 266,618.[20] The claim reads: "An execution of the process at lower temperatures or for shorter periods of heating." *Example:* Kondakow product, 100 parts, sulphur 10 parts, piperidine, 0.75-part, heated one hour at 120 to 125° C. and 2¼ atmospheres, or 15 minutes at 135 to 145° C., and 3½ atmospheres.

A vulcanizing process[25] for the Kondakow rubber using derivatives of piperidine was next claimed on December 25, 1912, by Bayer. The claim specifies the vulcanization of products of the Kondakow process by derivatives of piperidine and its homologs instead of by the bases themselves. *Example:* Kondakow product, 100 parts, sulphur 10 parts, *n*-thiopiperidine, one part, mixed on the rolls and heated one hour at 120 to 125° C. and 2¼ atmospheres pressure.

The use of alkyl esters of inorganic acids as polymerization accelerators formed the subject of patent application[26] by Dr. Hans von Euler, of Stockholm, January, 1913. The claim covers the polymerization of isoprene, etc., accomplished in the presence of alkyl esters of inorganic acids, preferably amyl nitrate or amyl halides.

The subjection of the polymerization products derived from patents Nos. 271,849[16] and 272,399[21] to ordinary rubber vulcanization process is covered by the next patent application,[27] one of the Badische company, of January 28, 1913. *Example:* Isoprene polymer, 100 parts, sulphur, 10 parts, intimately combined on the mixing rolls, and the formed articles therefrom vulcanized in the ordinary manner.

The substitution of aliphatic bases or their derivatives for piperidine, its homologs or their derivatives for vulcanzation accelerators was covered in a Bayer application[28] of February 21, 1913. The claim specifies: "Vulcanization of the Kondakow product with difficultly volatile derivatives of low-boiling bases instead of with piperidine, its homologs, or their derivatives." *Example:* Kondakow product, 100 parts, sulphur, 50 parts, tetramethylenediamine, one part, mixed on the rolls, and the mass heated three hours at 143° C.

The same procedure as the last, applied to the process of patent No. 265,221,[18] was also claimed February 21, 1913, by Bayer.[29] *Example:* Dimethylbutadiene, 100 parts, sulphur, 10 parts, tetramethylenediamine, one part, vulcanized one hour at 120 to 125° C. and 2½ atmospheres pressure.

Another patent[30] for overcoming the tackiness of synthetic rubber was applied for by Dr. Julius Ephraim on April 1, 1913. The invention claims: heating synthetic rubber in the absence of air, with sulphur, and, optionally, with addition of oxygen or nitrogen compounds, almost up to actual vulcanization of the product. *Example:* Sticky synthetic rubber (from isoprene and amylene), 100 grams, sublimed sulphur, 10 grams, "Goloshresin" (one-third rosin and two-thirds gas-tar from naphthalene); six to eight grams, intimately mixed on rolls moistened with glycerine; then heated in sealed vessel at 135° C. for ¾-hour.

The use of alkalies and alcoholates in the vulcanization of synthetic rubber was proposed by Badische on April 16, 1913.[31] The claim covers the preparation of vulcanized synthetic rubber by the action of caustic alkali, alkali alcoholates, and similar compounds, on synthetic butadiene, etc., polymerization products, with heating. *Example:* Isoprene polymer (by process of patent No. 271,849),[16] 100 parts, first treated on the hot rolls with potassium acid tartrate and then with caustic soda and heat. The product is then combined with sulphur, 10 parts, and vulcanized two hours at 2½ atmospheres pressure.

The use of organic acids or their acidic derivatives as vulcanization accelerators for synthetic rubber was proposed by Badische on April 16, 1913,[32] claiming: a vulcanization process characterized in that benzene-insoluble synthetic rubber products are subjected to the action of organic acids or their acidic derivatives, except nuclear carbon acids or their derivatives. *Example:* Polymerized synthetic rubber made by the process of patent No. 271,849,[16] 100

[15] No. 265,221, Oct. 3, 1913.
[16] See India Rubber World, Apr. 1, 1940, p. 50.
[20] No. 266,618, Oct. 28, 1913.
[21] No. 272,399, Mar. 28, 1914; supplement to No. 271,849.
[22] No. 294,817, June 28, 1917.
[23] No. 266,619, Oct. 27, 1913; supplement to No. 265,221.
[24] No. 267,945, Dec. 3, 1913.
[25] No. 268,387, Dec. 13, 1913; supplement to No. 266,618.
[26] No. 301,088, Oct. 3, 1917.
[27] No. 279,835, Oct. 27, 1914.
[28] No. 268,947, Jan. 8, 1914; supplement to No. 266,618.
[29] No. 269,512, Jan. 23, 1914.
[30] No. 273,774, May 6, 1914.
[31] No. 276,775, July 14, 1914.
[32] No. 276,960, July 17, 1914.

parts, potassium acid tartrate, 40 parts, worked up on hot rolls and then mixed with sulphur, 10 parts, magnesia, 10 parts, piperidine, 1.5 parts, on the rolls. The formed articles are vulcanized one hour at 2½ atmospheres pressure.

The carrying out of vulcanization of synthetic rubber in the presence of large amounts of glass, clay, quartz, etc., formed the subject of a patent application[33] by the Badische company on May 17, 1913. The claim reads: "Form of development of process of patent 287,787[15] and its supplements, wherein the treatment of butadiene compounds with the alkali metals and CO_2 is accomplished in association with mechanical movement in the presence of solid, non-metallic substances," for instance, the use of porcelain balls and a ball mill.

The addition of metallic hydroxides or organic hydroxyl compounds to form accelerators of polymerization in the metallic sodium reaction (Harries process) was claimed on August 2, 1913, by Badische.[34] *Example:* Isoprene, 100 parts, sodium wire, three parts, caustic soda (very finely powdered), four to five parts. The mixture is shaken in a sealed vessel for two or three days until the sodium is finely subdivided, and the liquid has begun to be viscous. It is then allowed to stand. The sodium and sodium hydroxide residues sink to the bottom, and after six days the liquid becomes solid and is taken from the vessel in one piece.

A process for the separation of lower molecular weight by-products from actual synthetic rubber was proposed for patent[35] on August 6, 1913, by Arthur Heinemann, of London. The claim specifies: adding ethyl acetate to isoprene before the latter's polymerization to rubber, or treating the isoprene polymerization product with ethyl acetate.

The use of heat in combination with metallic sodium and CO_2 for polymerization forms the basis of a Badische application[36] of September 23, 1913. The claim covers the operation of the process of No. 287,787[15] and of its supplements, No. 294,816[17] and No. 294,817,[22] at higher temperature. *Example:* Isoprene, 100 parts, sodium wire, five parts, in a sealed vessel in an atmosphere of CO_2, heated to 40 to 50° C. and shaken until a voluminous black mass is produced (about 10 days).

The lessening of the tackiness of synthetic rubber again forms the subject of invention in the Badische application[37] of January 1, 1914, the claim of which covers: the treatment of synthetic polymerized butadiene products with caustic alkalies, alkali alcoholates, or similar compounds, while heating. *Example:* Isoprene polymer (from isoprene and carvenozonide), 100 parts, sodium alcoholate, one part, mixed on the rolls, the temperature of which is gradually raised to 100° C. After one-half hour the initially benzene-soluble sticky rubber is transformed to benzene-insoluble elastic material of good durability.

Amines as vulcanization accelerators for synthetic rubber are covered by the Bayer application[38] of January 1, 1914, which claims: the acceleration of the vulcanization of the Kondakow product (dimethylerythrene) by adding basically reacting ammonia derivatives, the dissociation-constant of which is over 1×10^{-8}. *Example:* Isoprene rubber, 100 parts, sulphur, 10 parts, para-phenylenediamine, two parts, mixed and heated in the press 15 minutes at three atmospheres steam-pressure.

Finally, on January 10, 1914, the Badische company recognizes that synthetic rubber products are frequently mixtures and not compounds and makes application for patent[39] for an important invention to unify more nearly the final product. The claim specifies the treatment of benzene-insoluble polymerized synthetic rubber products with organic acids or their derivatives, except nuclear carbon acids and their derivatives. *Example:* Isoprene polymer (from process of French patent No. 459,005), 50 parts, and potassium tartrate, 20 parts, are mixed on hot rolls. The roll temperature is then raised by steam-pressure to 110 to 120° C. and in one-quarter to one-half hour a soft mass is produced, which is washed on the warm rolls with alkaline water and dried. The product is a light gray sheet, the elasticity of which improves on storage.

[33] No. 296,787, Jan. 10, 1918.
[34] No. 281,966, Feb. 8, 1915.
[35] No. 276,678, July 13, 1914.
[36] No. 294,818, June 29, 1917.
[37] No. 280,197, Nov. 3, 1914.
[38] No. 280,198, Nov. 3, 1914.
[39] No. 279,780, Oct. 28, 1914

Device for Packaging with Pliofilm

Anticipating the extension of the stretch-wrap packaging principle, used now in wrapping solid articles in Pliofilm, to powdered, granular, and even liquid substances, the Goodyear Tire & Rubber Co., Akron, O., has filed a patent application on a vacuum-type applicator, especially designed for this purpose. Operating principle of the new device consists in placing a heated sheet of Pliofilm over the aperture of a metal chamber of the desired package size, while the air is being exhausted from the chamber through outlets connected to a vacuum circuit. The suction causes the stretchable heated sheet to expand and to be pulled into the chamber so as to fit against the contour of the chamber's walls. Material to be packaged then is poured into the pre-shaped package. Prior to release of the edges of the sheet for removal from the machine, the package is sealed by heating and twisting the opening.

Preventing Fires

(*Continued from page* 43)

good assurance that it will be properly handled. The foreman and several key men in each department should be thoroughly instructed in the hazards over which they have control, in the procedure to follow in case of fire, what extinguishers to use, and how the automatic protection functions.

Large plants, in addition, should have well-organized fire brigades trained to use the correct types of extinguishers on all classes of fires they are likely to encounter. They should possess accurate and complete knowledge of the extent of sprinkler systems, the importance of keeping them always in service, where and when to shut off the sprinklers after a fire, how to drain the systems, and the importance of restoring the systems to service promptly after a fire.

Part of a plant fire brigade should function as a salvage corps whose duties during a fire would be to cover machinery and stock subject to water damage, sweep water out of the building, and keep constant watch in the rooms adjoining the fire area and in floors above and below, to make sure that fire is not spreading in some unsuspected way and that damage by water is being kept at a minimum. After a fire is extinguished and protection restored, every effort should be made to clean machinery promptly to prevent rusting and to salvage damaged stock in order to prevent further damage and keep the loss at a minimum.

EDITORIALS

American Patent Sesquicentennial

THIS year marks the celebration of the one hundred and fiftieth anniversary of the founding of the American patent system, which through this period has been instrumental in fostering individual and national advancement. First in the series of fitting observances was the national Modern Pioneer program in February by the National Manufacturers Association, which honored a large selected group of the inventors who during the last 25 years have contributed to progress.

During the week of April 8 to 14 a Parade of Inventions exhibit was held in Washington, D. C., under the sponsorship of a United States Patent Law Sesquicentennial Committee on which 30 American societies and associations were represented. The high point of this week was April 10 which had been proclaimed as Inventor's and Patent Day on which a Parade of Industries was featured at the banquet.

Emblematic of its contribution to national advancement, the rubber industry was well represented throughout these observances. Of the 19 famous contemporary inventors of the nineteenth century Charles Goodyear occupies a rightful place. Among the 590 modern inventors honored in the Modern Pioneer program 30 were chosen from the rubber industry. In the Parade of Inventions at Washington the accomplishments with rubber were indicated by numerous displays of outstanding modern products, and in the Parade of Industries the rubber industry was represented by a costume made entirely of rubber and featuring a skirt of blue crepe from which were suspended 9,000 rubber bands.

Indicative of the growth of the American patent system and its far-reaching influence is the fact that only three patents were issued in 1790, the first year of federal control; whereas more than 40,000 patents are now granted annually, and the grand total of United States patents to date approaches 2,200,000. Despite the shift in research from individual to group workers in company owned laboratories the individual still ranks highest as a patent recipient. Of the patents issued in a year 42.9% go to individuals, 34.5% to small corporations, 17.2% to large corporations and 5.4% to foreign companies.

Some derogatory statements have been made relative to the practical results of invention, and changes in our patent law have been suggested. Although alteration of the mechanics of patent registration may be desirable from time to time, the multitudinous benefits of invention which have accrued under the American patent system offer mute testimony as to the soundness of the principles under which the system has operated and justify unqualified patentee ownership, the incentive for invention.

Probably the greatest direct effect of invention is manifested in manufacturing activities through the production of the patented article and, therefore, in employment. If this be true, some statements that invention has created unemployment during the past decade of depression can be disproved by comparing employment for 1929 and 1939 in manufacturing and other phases of national life. A considerable decrease in employment for 1939 from 1929 was evident in branches having minor invention activities: namely, agriculture, 5% less; forestry and fishing, 21% less; mining, 27% less; construction, 35% less; transportation, 20% less; and public utilities, 22% less. In contrast to the above marked decreases, employment by manufacturing companies showed a decline of only 0.34%. These statistics can only be interpreted as a commendation for invention and our patent system.

Crude Rubber Stocks

AN ANALYSIS of the present rubber supply indicates that the action of the International Rubber Regulation Committee in releasing 75% of the basic quota for the last quarter of 1939 and 80% in 1940 has ended the decline in United States stocks which existed through 1939. Revised 1939 monthly statistics for the United States show a steady decline from 220,727 long tons at the end of January, 1939, to 105,205 long tons on November 30 and 125,800 long tons on December 31. U. S. stocks this year, including delivered barter rubber, have been: 156,830 long tons on January 31; 148,776 on February 29; and 149,678 on March 31. Thus the consumption appears to have been equalized, with stocks around 150,000 tons, which is higher than at the low point in 1939, but still far below those of early 1939.

The inventory at the end of 1938 constituted 6.36 months' supply based on monthly consumption in 1938 and at the end of 1939 only 2.54 months' supply based on 1939 monthly consumption. As U. S. consumption has averaged over 52,000 long tons for the past eight months and approximately 50,000 in February and March, the present inventory constitutes not more than three months' supply. Stocks inside regulated areas are not reported for 1940, but had increased only slightly from August 31 to December 31, 1939. Stocks outside of regulated areas decreased 11,259 tons from August 31 to December 31 and then rose 56,183 tons by February 29.

Some rumors have been heard that at its meeting in May the regulation committee may consider lowering the export quota for the third quarter. However such action does not appear to be logical in view of the still questionable regular stocks, the incompleted barter stocks, the general prospects for greater consumption in the not-too-distant future, and the indefiniteness of world conditions which influence an uninterrupted supply.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

Division of Rubber Chemistry Meets in Cincinnati

IN CONJUNCTION with the ninety-ninth meeting of the American Chemical Society in Cincinnati, O., from April 8 to 12 the Division of Rubber Chemistry held its technical sessions and banquet at the Hotel Gibson. Over 250 attended the two technical meetings in the afternoon of April 11 and forenoon of April 12, with 300 present at the banquet on April 11.

In addition to the ten papers, abstracts of which were published in the April issue of INDIA RUBBER WORLD, the technical sessions included a detailed report of the Crude Rubber Committee.

Crude Rubber Committee Report

Chairman George Sackett, speaking for the committee, which now consists of seven regular members each with a well-informed alternate instead of the former five members, expressed his appreciation of the splendid cooperation and briefly reviewed the accomplishments during the five years of the committee's existence. He cited the gratifying adoption of the standard recipe for testing the rate of cure of crude rubber both here and abroad; the publication of standard methods for determining copper and manganese in crude rubber; and tentative procedures for the testing of latex, of which he proposed an early offering as standard methods; and consideration of a method for determining the plasticity of crude rubber, without final unanimity of opinion as yet, and methods of determining the foreign matter in crude rubber as well as its age resistance.

Mr. Sackett said that the full committee had met in January, and he reported discussion and progress on the following subjects: (1) *Plasticity*—Details well accepted and procedures to be expected soon; (2) *Latex Testing*—Tentative procedures published and reprints being distributed to committee members and foreign correspondents, with the test for mechanical stability under study in several laboratories leading to expected procedures for presentation at the fall meeting; (3) *Packaging*—Bales of treated hessian cloth considered superior to wooden cases, but not entirely satisfactory. He said the committee believed that a distinct advancement in the packaging of crude rubber through the medium of a rubber wrapper was presented by Don Andrews in an article on the subject "The Packaging of Smoked Sheets for Plantations Shipment" published in the March issue of INDIA RUBBER WORLD; (4) *Sampling*—No standard procedure proposed as yet, but serious consideration is being given; (5) *Age Resistance*—Conflicting data from earlier study necessitate further investigation with the aim to develop an accelerated test and a recipe which will show the effect of materials such as copper, manganese, and natural substances believed to be present often and to affect age resistance; (6) *Rate of Cure*—In consideration of requests in this country and from abroad as to a satisfactory standard of rate of cure much work has been done toward determining a standard set of conditions. If rate of cure is to be compared at a standard cure and modulus, the committee suggests a cure of 40 minutes at 126° C. and modulus of 700%; (7) *Determination of Foreign Matter*—The market method of grading by comparing a dried sample with a given standard is only comparative. Of two methods being considered a laboratory method based on solution of the rubber in benzol, filtering, washing with solvent, and weighing the residue requires a long time, and because of the small sample is difficult of duplication. A factory method suggested for consideration was presented in detail by E. W. Oldham, a committee member, and consists essentially of selecting 50 pounds from each of 20 bales, cracking, and washing with six passes on a factory mill line with a 50-mesh screen in a special pan under the mill to collect all foreign matter, and analysis in the laboratory by burning volatile matter followed by dissolving iron contamination from the mill with HCl, and weighing the residue as sand.

Business Meeting

At the conclusion of the technical sessions Chairman E. B. Curtis opened the business meeting by announcing the following decisions of the Executive Committee: (1) creation of a committee to report on suggested changes in the procedure for electing officers; (2) appointment of a Papers Committee to study the rules for submission and publication of papers; (3) endorsement of a rubber group in Buffalo being formed under the direction of B. W. Wetherbee, of the Globe Woven Belting Co.; and (4) publication in the July, 1940, issue of *Rubber Chemistry and Technology* of the complete list of members of the division.

C. R. Haynes, chairman of the Membership Committee, reported 50 new members and urged members to extend invitations to their co-workers. In the absence of Dr. H. L. Trumbull, the report of the Nomenclature Committee, as read by Mr. Curtis, indicated progress and promised a report of results at the fall meeting. R. H. Gerke, chairman of the Planning Committee, indicated a belief that more symposiums should be held and asked for suggestions. The report of the Goodyear Hall-of-Fame Committee, read by H. I. Cramer, stated that facts and data on Charles Goodyear had been submitted to the electors and that favorable action was hoped for in October. The Goodyear Lecture Committee stated that there were no nominations this year, but that probably there would be next year. The Auditing Committee reported the division's books to be in satisfactory order.

Banquet

The division banquet, held in the Roof Garden of the Hotel Gibson, was attended by 300 members and guests and gave evidence of careful planning by the committee, which consisted of V. L. Smithers, chairman, Enos Baker, and A. C. Eide. Several musical and dancing acts were followed by J. Elder Blackledge, who demonstrated many feats of magic and narrated interesting phases of their history. Dr. C. L. Parsons, secretary of the A. C. S., and the group chairmen present, Ralph La Porte (Akron), Charles Haynes (New York) and James Walton (Boston), and B. W. Lewis (secretary, Chicago), were introduced by Chairman Curtis, who also expressed to Proctor Thomson the acknowledgment and thanks of the division for the able assistance and substantial contribution to the entertainment program by the Cincinnati Section, A. C. S.

Boston Group Holds Symposium on Plastics

ONE of the most ambitious meetings ever arranged by the Boston Group, Rubber Division, A. C. S., which comprised a plastics symposium of five papers and a sound film, was held at the University Club, Boston, Mass., April 5, with the large attendance of approximately 285 members and guests, including a number of representatives from the plastics industry.

The symposium was opened by Prof. Charles E. Reed, Massachusetts Institute of Technology, whose subject was "General Nature and Properties of Synthetic Plastics." He discussed some of the elementary concepts involved in the chemistry of plastics, illustrating the differences in molecular structure of thermosetting and thermoplastic materials by means of simple diagrams. He said the polymerization or condensation of basic materials must be controlled closely to obtain desired properties and that plastics were not generally reenforced by the same type of materials as was rubber, but rather by fibrous materials.

The next paper, on "Vinylite Plasticized Resins—A New Development of Many Applications," was presented by J. R. Price, of the Plastics Division, Carbide & Carbon Chemicals Corp.

According to Mr. Price, Vinylite plasticized resins are in no sense synthetic rubbers. The rubber-like characteristics are obtained only after the addition of plasticizers. The unplasticized resins are white powders which are, chemically, copolymerized vinyl chloride and vinyl acetate. After the addition of plasticizers, stabilizers, lubricants, and dyes in a heated Banbury, the mixture may be sheeted, extruded, or molded as is rubber except that no curing is required. The finished transparent or opaque plastic is elastic, inert to oxidation and many chemicals, Mr. Price pointed out, and has an elongation up to 300% and a tensile of 3,000 pounds per square inch. The chemical and physical properties depend upon the type and amount of plasticizer. Recovery from elongation is slow; the resin will withstand flexing without cracking and will not change upon aging. Vinylite resins have a limited thermal life; therefore the processing temperature must be more accurately controlled than in the case of rubber. As the resin is thermoplastic, it may be heat-sealed when fabricating. Mr. Price enumerated a number of Vinylite products, of which he displayed belts, suspenders, garters, shoes, watch straps, tubing, insulated wire, and insulating tape. The speaker emphasized in conclusion that Vinylite will supplement rubber and aid in broadening the industry's outlets.

W. E. Gloor, of the Hercules Powder Co., spoke next on "Cellulose Derivative Plastics," saying that these materials were incompatible with rubber even with a mutual solvent present. Mr. Gloor pointed out that cellulose derivatives had replaced rubber products in certain cases, notably auto steering wheels and combs. The processing of cellulose plastics and the properties of the various types were described. Properly plasticized ethyl cellulose as a coating for blasting cap wire will protect it from moisture and abrasion, and combined with Paraplex RG 2, a proprietary resin, gives a lacquer adherent to rubber.

In the next paper, "Some Interesting Properties of Acrylic Resins," by W. F. Bartoe, Rohm & Haas Co., the structure, polymerization, and properties of this large group of esters of acrylic and methacrylic acids were discussed. Resins in several forms were exhibited: as a hard solid, dissolved in an organic solvent, in aqueous suspension, and as a finely divided powder. The outstanding properties of these resins are their almost perfect transparency, and resistance to sunlight. Mr. Bartoe discussed tensile and impact strength, thermal recovery, and their measurement.

In closing the symposium with a paper on "Polybutene in Rubber Compounds," L. B. Turner, Standard Oil Development Co., said that there were two standard types of polybutene, one a viscous liquid with a molecular weight of from 12,000 to 15,000, and the other a solid elastic with a molecular weight of from 80,000 to 120,000. Recent developments, he pointed out, have led to the small-scale production of polybutene with a molecular weight of about 200,000, and experimentally with a molecular weight of 400,000. With the higher molecular weight materials, larger percentages can be added to rubber without seriously affecting the physical properties of the resulting compound, and the beneficial properties of polybutene may be thus enhanced. According to Mr. Turner, it seems reasonable to assume that the polybutene not only surrounds the rubber molecule to protect it against the influence of aging, but also fills up the interstices to check the penetration of gases or moisture. The speaker further pointed out the importance of plasticizers and that care must be taken not to over-masticate polybutene, as the resulting lowering of molecular weight and attendant depreciation in physical properties cannot be regained.

Before dinner a sound movie on safety glass, prepared by the American Safety Glass Association, Inc., was presented through the courtesy of the Monsanto Chemical Co., Plastics Division. The advantages of plastic-laminated glass over ordinary or case hardened glass were strikingly depicted. The plastic used in this instance was polyvinyl butyraldehyde, a material exhibiting considerable elasticity.

The loss of one of the group's most ardent supporters, Charles Reid Boggs, through death on April 1, was announced by James C. Walton, Group chairman, who presented a tribute to Mr. Boggs covering his many years of inspiring service to the cause of rubber chemistry and technology.

Akron Rubber Group Hears Airships Discussed

ON FRIDAY, March 29, the Akron Group, Division of Rubber Chemistry, A. C. S., held its spring meeting at the Akron City Club with 211 members and guests attending. After dinner, which was held at 7 p. m., Chairman R. T. La Porte introduced Congressman Dow Harter who, in announcing the guest speaker of the evening, stated that his interest in the future of lighter-than-air ships was increased because of the enthusiasm of Capt. Garland S. Fulton from the Bureau of Aeronautics, United States Navy, Washington, D. C. Captain Fulton gave a very interesting and quite detailed talk on airships and their relation to airplanes in connection with national defense. Differentiating between the various types of airships, Captain Fulton reviewed the early history of record-making flights and discussed the technical aspects of airship navigation. Expressing his confidence that rigid airships have a definite function in national defense, he traced the history of the invention, the skeptical reception, and the later perfection and acceptance of the submarine as an illustration of the transition period through which he believes the lighter-than-air craft is passing.

Captain Fulton is well known in Akron as the result of frequent visits during the construction of the *Macon* and the *Akron*. After several years of sea duty following his graduation from Annapolis, he went into aviation construction work. During the early stages of the building of the *Los Angeles*, he was sent to Germany, where he studied airship construction.

Officers of the Akron Group elected for the coming year are: chairman, H. V. Powers (Goodyear); vice chairman, L. V. Cooper (Firestone); and secretary, T. L. Stevens (C. P. Hall Co.). Starting with Goodyear in 1916, Mr. Powers is now in charge of the compounding section of the Goodyear research department. Mr. Cooper has been associated with Firestone since 1922 in a technical capacity. Mr. Stevens, with C. P. Hall for many years, was group secretary last year.

Los Angeles Group Meets

GOLF ball manufacture was the main subject at the meeting of the Los Angeles Group, Rubber Division, A. C. S., held at the Mayfair Hotel, Los Angeles, Calif., on April 2. A. S. Rocklen, factory manager of the Golden State Rubber Mills, discussed processing and compounding difficulties encountered in producing golf balls to meet exacting quality requirements. E. G. Brooks, of Golf Ball Service, explained what happens during play, how distance qualities are built into the balls, and why cover corrugations aid in securing accuracy in flight. John Duncan Dunn, world authority, gave a short talk on the history of golf, and exhibited two golf balls—one 150 years old with a leather cover and stuffed with feathers and the other 50 years old made entirely of balata.

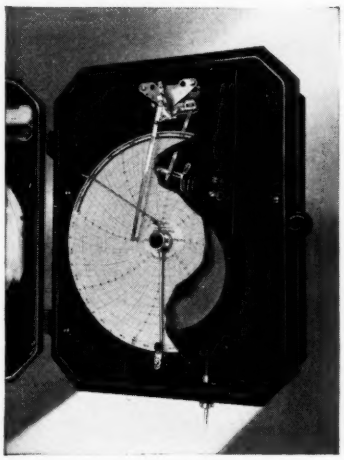
The program concluded with a motion picture, "More Goods for More People with Automatic Control," shown by J. A. Corlett, General Electric Co. The film contained much interesting information on automatic electric and robot control in plant production.

Distinguished guests present, who were introduced, were: E. W. Schwartz, General Electric Co.; C. Kawakami, Yokohama Rubber Co., Yokohama, Japan; and Dr. Ing. Giuseppe Cozzo, consulting rubber engineer, Milan, Italy.

All members and guests present were given a one-pound jar of Ben Hur coffee by D. Hecht & Co., importer of rubber and coffee, through its representative, Fred Ehrlich. Carl E. Stentz (Latex Seamless Rubber) won the door prize, an electric clock donated by H. Muehlstein & Co., through C. H. Churchill, of that firm. A briefcase from the C. P. Hall Co., donated through its representative Fred Woerner, was won by E. H. Lewis (Western Insulated Wire). Boxes of colored golf balls were won by R. B. Stringfield (consultant) and Mr. Schwartz, in a quiz by Mr. Rocklen.

New Machines and Appliances

Press with Electrically Heated Platens



New Taylor Recorder

Improved Recorders

NEW recorders for temperature, humidity, pressure, rate of flow, etc., are companion instruments for the new line of Fulscope Controllers presented here last month. Exclusive of the controller mechanism, the recorders and recording controllers are identical. The cases of the recorders are drilled and tapped to receive any of the five standard Fulscope control mechanisms should it be desirable to convert the instrument into a controller at a later date.

The recorder case is for both face and flush mounting, is finished in black or white, and is sealed against dust and moisture. The time required for changing charts is reduced by a mechanism that combines the chart locking device and pen lifter. The instruments are made for 10- or 12-inch charts, and with one, two, or three pens. Taylor Instrument Cos., Rochester, N. Y.

Electrically Heated Press

A SELF-CONTAINED hydraulic press for molding rubber goods features electrically heated platens with individual thermostatic control for both upper and lower platens. The hydraulic system utilizes dual pumps; high and low pressures are under operator control. Electrical heating of the platens is said to insure close heat control such as required in the production of precision rubber printing plates. The press is made in several different platen sizes. Stereotype Equipment Co., 2815 Irving Park Rd., Chicago, Ill.

High-Temperature Swing Joints

HIGH-TEMPERATURE swing joints are designed for operation at working pressures up to 500 pounds per square inch, at temperatures up to 700° F. Increased diameters are provided at the elbows to assure maximum flow with minimum pressure drop. No packing glands, stuffing boxes, nuts, or bolts are used. All pressure is transmitted through double rows of hardened steel balls in flame-hardened races. The packing chamber is machined to close tolerances and then chromium-plated and polished; while the packing set is a combination of asbestos and brass rings, held in place by the tension of an alloy wire spring. There are six different styles of this joint for full 360° rotation in one, two, or three planes. Chiksan Tool Co., Brea, Calif.

Streamlined Press for Rubber and Plastics

THE hydraulic press here illustrated is one of 12 modern streamlined units recently built for molding small rubber and plastics articles. The housing, top, bottom, and sides, is a single casting. The cylinder is of Meehanite; while both cylinder and gland are lined with bronze. Gland studs and nuts are stainless steel.

The press shown is equipped with 20-inch square plates of rolled steel, machined to a smooth finish and drilled so as to permit maximum steam circulation and uniform heating. It is designed to operate at an initial water pressure of 2,000 pounds per square inch. Platen steam connections are flexible metallic tubing, enclosed by sheet metal guards which can be quickly removed to give access to the platens and piping. Platen temperature is automatically controlled by an air-operated diaphragm valve located in an opening in the top of the press. Steam, air, and water pressure and platen temperature are all indicated by gages mounted on the front of the press. Farrel-Birmingham Co., Inc., Ansonia, Conn.

V-Belt Fasteners

TO MEET the increasing demand for a practical method for fastening V-belts, a new line of Alligator fasteners has been developed for "B," "C," and "D" section V-belts. The fasteners are used only on cross-woven fabric V-belts and should not be applied to cord belts. The fastener consists of two die-formed steel end plates, two bushings, two two-piece rocker pins, and special nails. The end plates are held on to the ends of the belt by the nails and are narrower than the belt so that no metal comes in contact with the sheaves.

(Continued on page 71)

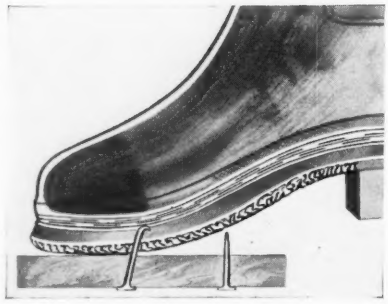
Chiksan High-Temperature Swing Joint with Two-Plane Rotation

Modern Farrel-Birmingham Press

New Goods and Specialties

Rubber-Steel Safety Insole

THE M. S. A. safety insole for foot protection against nails and other sharp metal projections is built of two layers of overlapping steel strips, molded in rubberized fabric. The staggered steel strip construction permits easy flexing of the insole. Mine Safety Appliances Co.



M. S. A. Safety Insole

Latex Mending Cement

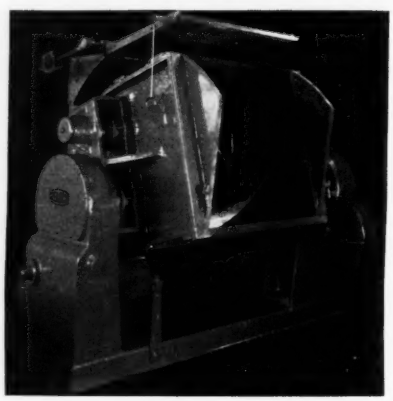
A LATEX cement, sold under the name "Liquid Thread," mends fabrics, paper, leather, or leatherette and adheres to non-porous surfaces such as glass. Used on fabrics, it provides a heat-proof and waterproof mend, said to be unaffected by washing or ironing. It may be used for joining or binding rugs and, when applied as a coating, imparts anti-skid qualities to rugs, telephone bases, etc. "Liquid Thread" also finds application as a general adhesive for use in the office, home, and school. Paste Elastic Mfg. Corp.

Style B. T. Solvent Hose

Rubber-lined Mixer for Abrasive Material

A DOUBLE-ARM mixer with rubber-lined bowl and rubber-covered arms has been designed for mixing corrosive abrasives, including pulverized solids and heavy liquids, into a semi-plastic state. To assure adherence of rubber to metal a special vacuum process is used in the application of the rubber to the mixing bowl and arms.

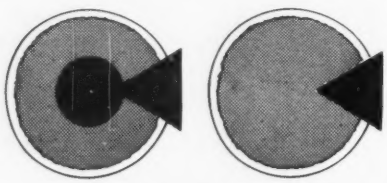
The mixer utilizes a dust-tight cover; permanent charging connections, located in the stationary portion of the cover; and a large diameter dump trunnion, concentric with the front arms. The double-arm overlapping action is said to produce effective mixing. The mixer illustrated has a working capacity of 225 gallons and a total capacity of 338 gallons. Read Machinery Co., Inc.



Readco Rubber-lined Mixer

Coreless Golf Ball

AN INNOVATION in golf ball construction is embodied in the Scotch Flyer coreless golf ball which is made without the standard solid or liquid center. The ball is completely wound from center to cover with rubber thread. According to the manufacturer, elimination of the core provides greater distance in flight. The ball is also said to have perfect distribution of weight. Golf Ball, Inc.



Left, Standard Golf Ball with Core; Right, New Coreless Ball

Improved Elastic Yarn for Full-fashioned Hosiery

AN IMPROVED Controlastic yarn for the hosiery trades is made of an abrasion-resisting, stain-resisting rubber core, covered with nylon threads. The core has Controlastic's multi-ply construction, being composed of many wrapped layers of latex. Absolute smoothness and complete lack of fuzziness are claimed for the new yarn. This smoothness is said to prevent the yarn from sticking to the cone during hosiery manufacture. Elasticity of the yarn is maintained at about 125% to give the necessary stretch in the finished hosiery top, yet without the danger of the yarn kinking in processing. The high strength of yarn is said to lend itself to the production of lace or mesh designs which require exceptionally strong yarns. Firestone Rubber & Latex Products Co.

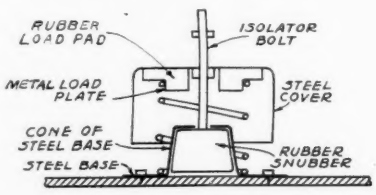
Paint and Solvent Hose

STYLE B. T. solvent hose for use on equipment for spraying paints, lacquers, and other solvent-containing fluids is composed of a tube of synthetic rubber, reenforced with two plies of braided cotton yarn. The cover is of black rubber compound and is lead-press cured. The hose is also said to be adapted for handling benzol, carbon tetrachloride, drying oils, lacquer thinners, turpentine, and gasoline. The hose is made in 500-feet lengths and in three sizes: ¼-, ⅜-, and ½-inch, weighing 7.4, 9.8, and 11.9 pounds per 50 feet, respectively. Bursting strength is 1,200 pounds per square inch for the ¼-inch hose and 1,000 pounds per square inch for the ⅜- and ½-inch sizes. The Goodyear Tire & Rubber Co.

Controlled Spring Isolator for Mounting Machinery

IN THE J-M controlled spring isolator for mounting machinery, a metal spring and rubber combine to support the load and isolate vibrations; while an adjustable rubber snubber operates inside the steel base to control excessive motion. The rubber parts are protected against oil by metal. High compliance to both vertical and horizontal forces are said to be provided by the design.

The load is held securely to the steel isolator cover by a bolt and nut. The bolt projects through the isolator cover and has its other end embedded in the rubber snubber. An interior cap nut, through which the bolt passes, permits raising and lowering of the rubber snubber during adjustment for the actual field load. There are two sizes—light duty for loads from 50 to 190 pounds per isolator and heavy duty for loads from 250 to 750 pounds per isolator. Johns-Manville Corp.



J-M Spring Isolator

UNITED STATES

Industrial Activity at Pre-War Standing

Business has sunk to the level of August, 1939. But the recession lately proceeded more slowly than in early 1940. The key to the situation lies in inventories, which have been rapidly and heavily accumulated in recent months. If they are liquidated, further set-backs in industrial activity seem certain. Export trade, though, continues to support the current volume of domestic business. In general, employment and payrolls registered further declines.

Building proved the most disappointing of major industries this year; awards to date, though substantial, are below those of 1937 and 1939. Shoe manufacturing also is under a year ago, with business tapering off; new orders for summer footwear have not been as anticipated, and promotion of fall lines, which get under way in May or June, may start earlier than usual this year. The heavy machine industry, at depression levels for a decade, promises no improvement in sales over last year unless a general upturn materializes. Wool goods activity likewise has been very unsatisfactory.

Farm equipment manufacturers, however, believe 1940 sales will be 10% higher than for 1939, or even better. Business in machine tools, chemicals, shipbuilding, electrical equipment, and airplane parts and engines continues good. Tin plate operations in April rose from 56 to 65%.

Fluctuations occurred in carloadings and lumber and steel output, which ended last month at 62% of capacity. The cotton mill rate and oil and power outputs increased after earlier declines. Automobile operations dropped, then rose, and April production is expected to exceed 400,000 units, equaling 1937 figures. No marked advance is seen for the remainder of the spring season. Factory and dealers' stocks hit a new high early in March, but rapid sales activity has developed since. First quarter sales, reported at 1,310,234 automobiles and trucks, were 23% above the first quarter of 1939 and resulted in the best first quarter since 1929. Factory output reached 1,546,319 vehicles.

The value of manufacturers' inventories of rubber products was up recently, but the value of shipments was down. Rubber firms in the Midwest reported declines in employment and payrolls; while New England manufacturers recorded moderate gains in activity. Insulated wire is making a very poor showing; and tire replacement business, which should swing into an upturn in April, has not developed as anticipated; but mechanical rubber goods are holding up well.

EASTERN AND SOUTHERN

U. S. Rubber Promotes Sheahan; Markets Improved Tire

United States Rubber Co., Rockefeller Center, New York, N. Y., through F. B. Davis, Jr., president and chairman, has announced the appointment of Emmet Sheahan, of Detroit, Mich., as general manager of the company's tire division, now a consolidation of all tire activities of the company heretofore handled by its automotive division and by the U. S. Tire Dealers Corp. Mr. Sheahan has also been elected president of the latter corporation, succeeding L. D. Tompkins, who will continue as a director, vice president, and a member of the executive committee of U. S. Rubber.

Mr. Sheahan, a native of Detroit, studied at the University of Detroit and at St. Mary's College, St. Mary's, Kan. After graduation in 1916 he joined U. S. Rubber as a salesman for solid tires, working in his native city. Later he was transferred to the company's automotive department and in 1928 became its sales manager. The next year he was named manager of the original equipment department and in 1934 operations manager of the Detroit and Indianapolis plants as well as in charge of sales of the company's products to automobile manufacturers. On December 28, 1938, Mr. Sheahan was made general manager of the new automotive division of the company.

Emmet Sheahan

Improved Farm Tractor Tire

U. S. Rubber has introduced a new and improved "U.S." Lug Farm Tractor Tire for use on both the present conventional and the new wide base rims. Other features include new, wide bars with plus rubber for wearing quality and additional strength, together with a concave face designed to improve traction and self-cleaning of the tread. The increased number of lugs was adopted to make the whole tread construction give maximum traction, easy rolling and riding qualities under all conditions, and to eliminate clutch chattering under very hard pulls.

Notes

Naugatuck Chemical Division of U. S. Rubber has moved its New York office from 1790 Broadway to Rockefeller Center, 1230 Sixth Ave.

Mr. Davis, who is chairman of the Industry Division of the Greater New York Fund, has appointed as chairman and vice chairman, respectively, of the Rubber Industries Section of the fund, Wm. E. Bruyn, treasurer, Littlejohn & Co., Inc., and E. S. Underhill, of U. S. Rubber.

Charles A. Wechter, who is retiring as building superintendent and tire warehouse manager after 44 years of continuous service with the Buffalo, N. Y., branch of U. S. Rubber, was honored on April 3 at a testimonial banquet at the Hotel Stuyvesant given by the Employes' Club of the company. Arrangements were supervised by Joseph W. Hupf.

CALENDAR

May 7.	Los Angeles Rubber Group, Mayfair Hotel.
May 13-15.	American Institute of Chemical Engineers. Statler Hotel, Buffalo.
May 16-17.	National Battery Manufacturers Association. Spring Meeting. The Greenbrier, White Sulphur Springs, W. Va.
June 3-6.	National Assn. of Purchasing Agents. 25th Annual International Convention and Inform-A-Show. Hotel Netherland Plaza. Cincinnati.
June 6-8.	17th National Colloid Symposium, Division of Colloid Chemistry, A. C. S. University of Michigan, Ann Arbor.
June 14.	New York Rubber Group Outing. Green Meadow Club, Harrison, N. Y.
June 24-28.	A.S.T.M. Annual Meeting. Atlantic City.
July 19.	Boston Rubber Group Outing.
Sept. 9-13.	A. C. S. Fall Meeting. Detroit.
Oct. 7-11.	National Safety Council. 29th Annual Safety Congress and Exposition. Stevens Hotel, Chicago.
Dec. 2-7.	14th National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York.

1940 Toy Fair—Latex Sponge and Kaysam Process Enter Toy Field

Toys made from latex sponge and by the Kaysam process were innovations at the thirty-eighth annual American Toy Fair, sponsored by the Toy Manufacturers of the U. S. A., Inc., which was held in New York, N. Y., for a three-week period, April 1 to 20. Exhibits occupied five floors at the Hotel McAlpin; while other displays were held at the Fifth Ave. Bldg., 1107 Broadway, and various locations in or near the city.

The latex sponge toys on display were shown by the Toyad Corp., Latrobe, Pa., manufacturing under license from Firestone. The toys shown, to enter retail outlets at once, were a Sleepytime Pal doll, Panda, Santa Claus, and Oswald the Rabbit. The Kaysam Corp. of America, Passaic, N. J., which entered the manufacturing field last year, showed its complete line of latex toys made by the Kaysam process, including elephant, kitten, duckling, duck, puppy, fish, rabbit, doll, hippopotamus, whale, submarine, and ocean liner. Major features claimed for the new toys are: complete lack of odor and taste, fast and harmless colors, even wall thickness which provides proper balance for flotation, indestructibility, and easy sterilization. Kaysam also showed three seamless beach balls, 12, 18, and 48 inches in diameter.

The use of rubber for automobiles, soldiers, trains, and other characters of interest to children is increasing in popularity as evidenced by the large assortment displayed by the Auburn Rubber Corp., Auburn, Ind., which now features an all-rubber molded train set comprising engine, box cars, and a tilting car, all of which are detachable.

This year the Pennsylvania Rubber Co., Jeannette, Pa., introduced a new play ball, the "Neonbal," so decorated that it produces chameleon-like color changes as it spins or rolls. The Barr Rubber Products Co., Sandusky, O., among its play balls featured a new gas-inflated, cellophane-wrapped ball as well as its regular sponge and inflated models. Seiberling Latex Products Co., Akron, O., also displayed inflated and sponge rubber balls, new Pinocchio characters, and a new bounce toy line, play balls with sculptured faces of dogs, owls, Humpty Dumpty, etc.

Sun Rubber Co., Barberton, O., showed a number of new rubber characters besides its regular toys. Balloons, including many novel designs were displayed by Lee-Tex Rubber Products Corp., Chicago, Ill., Anderson Rubber Co., Akron, and the Oak Rubber Co., Ravenna, O. The Seamless Rubber Co., New Haven, Conn., exhibited its standard line of toys, drug sundries, and bathing specialties. A cat, a dog, and a panda, molded in two parts with head attached by a button and movable, were by the Schavoir Rubber Co., Springdale, Conn.

Sponge rubber bath toys, containing a bar of baby soap, were featured by Bath Toys, Inc., Benton Harbor, Mich. The C. B. Webb Co., Lebanon, Pa., showed its established line of Weaver valve balls. A new Tony Sarg creation, displayed by Selchow & Righter Co., Brooklyn, N. Y., permits painting characters on sheet rubber, through stencils. Amusing antics are produced by stretching the rubber.

Intercontinental Rubber Report

Intercontinental Rubber Co., 745 Fifth Ave., New York, N. Y., in its recent annual report to stockholders for the year 1939 also explains the standing of its foreign holdings. Guayule rubber production continued in general without interruption at the Catorce and Cedros factories in Mexico. Late in 1939 the Torreon factory was put on a single-shift basis and now operates at about 60% of normal capacity while an efficient operating crew is being trained. Although the heavy and profitable guayule export business to Europe has been sharply curtailed since September, demand from other quarters thus far has substantially absorbed current production, which, if continued at the present rate, should reach 8½ million pounds this year. From Italy came a report that the worst winter in a century has seriously handicapped the "S. A. I. G. A." guayule planting program. Intercontinental's Sumatra plantation, with a base potential output of 2,533,097 pounds for 1939, exported 1,405,250 pounds after submitting to both I. R. R. C. and local curtailment. For 1940 the anticipated allotment of base productive capacity is 2,578,237 pounds, or 547 pounds per acre of mature rubber, which under a resurvey by the local Controller of Rubber Restriction last year was set at 4,717 acres, having 381,813 trees following selective thinning and other removals over a period of years. The company planted 148 acres during 1939 and will plant 76 acres this year. Thus the organization will have 6,524 acres of reserve area, 31 acres occupied by buildings, and 415 acres of swamps, roads, etc.

The Admiar Rubber Co., 273 Van Sinderen Ave., Brooklyn, N. Y., has changed its name to Ideal Rubber Co. Admiar, rubber division of the Ideal Novelty & Toy Co., doll manufacturer, Long Island City, N. Y., is the first of the subsidiaries to follow the new policy of having their names all harmonize with that of the parent concern. The rubber company will continue at its present address with the same management, headed by Factory Manager Maurice I. Sanders and Technical Superintendent Guy B. Wyatt. The firm is installing much new machinery which will permit expansion in many new rubber lines.

Lee Tire & Rubber Co., Conshohocken, Pa., has received a contract totaling $170,000 to supply automobile tires to the departments of the Commonwealth of Pennsylvania for the current year.

Cameron Promotes Stocker

Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y., has appointed William M. Stocker as chief engineer to succeed R. McC. Johnstone, who resigned some time ago. Mr. Stocker was hired by Cameron in February, 1925, as service manager and after several years was made assistant chief engineer. As such, he was largely responsible for many exclusive design features now incorporated in Cameron winders, rewinders, and slitters.

Mr. Stocker was born in New York, but educated in England. In 1914 he was chief engineer at Benjamin Eastwood Co., Paterson, N. J., but left in 1917 to enter the U. S. Army. After the war he became mechanical engineer with Poole Engineering & Machine Co., Woodberry, Md., and for the three years prior to joining Cameron was chief engineer of F. X. Hooper, Glenarm, Md.

Cameron Machine Co. at present is operating at capacity and expects to continue so for several months at least. Its engineering department is especially active with a number of new developments the company is pushing to completion.

Sloane-Blabon Corp., Trenton, N. J., has purchased 61 acres of land adjoining its plant to be used for future expansion.

Rubber Associates, Inc., recently moved its New York, N. Y., office from 1790 Broadway to 1230 Sixth Ave.

Hohwieler Rubber Co., Morrisville, Pa., is experiencing a boom meeting demand for athletic goods for the early summer trade.

U. S. Asbestos Division, Raybestos-Manhattan, Inc., Manheim, Pa., has appointed as technical director, effective May 1, Giles E. Hopkins, recently resigned from the United Shoe Machinery Corp., Boston, Mass. Prior to that association he had been for eleven years chemical engineer and technical director of the Bigelow-Sanford Carpet Co.

Morrison Rubber Co., Trenton, N. J., is busy on orders for semi-metallic pump packing produced in both bulk and pencil form, which can be inserted with an alemite pump. The concern finds business dropping off in other lines.

Mrs. Emma Linburg Tobin, 66, wife of Horace B. Tobin, former president of the Woven Steel Hose & Rubber Co., Trenton, N. J., died on March 23 after a long illness. Her father, the late Watson H. Linburg, had been a president of the United & Globe Rubber Co., Trenton.

Nearpara Rubber Co., Trenton, N. J., has received increased orders for reclaimed rubber.

Rubber Participates in Patent Law Sesquicentennial

The rubber industry played no small part in the recent festivities commemorating the one hundred and fiftieth anniversary of the United States Patent System, climaxed by a banquet on April 10 attended by 1,200 guests at the Mayflower Hotel, Washington, D. C., at which a fashion show was staged in which famous models were each gowned to represent one of the nation's great industries. The one symbolizing rubber wore a costume of blue rubber with 9,000 rubber bands forming a fringed skirt. For a crown she wore a small tire, and tubing formed her bracelets, necklace, and belt. Charles F. Kettering, president, General Motors Corp., was chairman of the national committee sponsoring the Patent Law Sesquicentennial.

Included among the men who rated on the inventors All-Time All-American was Charles Goodyear, discoverer of vulcanization.

A Parade of Inventions exhibit was held in the Commerce Building auditorium from April 8 to 14, and here, too, the rubber industry was in evidence. The B. F. Goodrich Co., the Goodyear Tire & Rubber Co., and the Firestone Tire & Rubber Co., all of Akron, O., and E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., had displays. Featured also were neoprene, "Thiokol," Vistanex, and imported Buna rubber. Firestone had an elaborate exhibit. Included among its tire displays were an all-synthetic airplane tire of rayon and neoprene; a 96-inch airplane tire weighing 940 pounds and capable of supporting a load of 80,000 pounds; and a 30.00 by 40 Earth Mover Tire 104 inches high and 2,390 pounds in weight. Other products exhibited were bathing suits, foundation garments, and shoes of Controlastic; Airtex mattresses and cushions; and the recently introduced seadrome contact light buoy to mark runways for seaplane take-offs and landings. As a demonstration of Airtex manufacturing methods, latex was whipped into aerated foam by an ordinary kitchen mixer and then cured in a pressure cooker; the small Airtex biscuits thus produced were distributed to exhibit visitors as souvenirs.

Thomas M. Royal & Co., Philadelphia, Pa., has placed in charge of its research, technical testing, and package development service Carl L. Brickman, for the past decade with the development and research departments of the Goodyear Tire & Rubber Co., Akron, O.

Wishnick-Tumpeer, Inc., manufacturer of chemicals, oils, and pigments, 295 Madison Ave., New York, N. Y., has appointed C. A. Hemingway as manager of its Cleveland, O., office. He has been with the sales department of Witco since 1922. Wishnick this year is celebrating its twentieth anniversary.

Tensolite Corp. Formed

The Tensolite Corp., with offices and laboratory at North Tarrytown, N. Y., was formed on March 27 under the laws of the State of New York for the purpose of manufacturing and developing a wide range of Tensolite ("tensilized" rubber hydrochloride) products. Officers of the new firm, wholly owned by H. D. Minich and privately financed, are: president, H. D. Minich; vice president, C. A. Minich; treasurer, I. H. Minich; and secretary, K. J. Sidebotham. According to a statement by the company, production has been started on cords, ribbons, and yarns; while subsidiary firms are to be organized for each of several types of Tensolite products.

A contract has existed between H. D. Minich, inventor of Tensolite, and The Goodyear Tire & Rubber Co., Akron, O., concerning Mr. Minich's activities in this field, which have in turn been assigned to the Tensolite Corp. These activities include the rights to manufacture the following Tensolite products: fine filaments for hair nets, stockings, filter cloth, tassels, etc.; yarns, threads, and cords for crocheting, braiding, hand weaving, etc.; bristles for brushes; heavy material for articles now made of leather, patent leather, and the like; sporting goods specialties, including braided fishing lines, tapered leaders, tennis strings, etc.; covered threads, cords, and twines; covered elastic threads for sewing, knitting, weaving, etc.; pharmaceutical items, such as dental floss. The Tensolite process was described in our April, 1940, issue.

The United States Department of Labor, Washington, D. C., in its recent lists of government supply contracts awarded includes the following: Navy, *cable:* Circle Wire & Cable Corp., Maspeth, L. I., N. Y., $51,471, General Electric Co., Schenectady, N. Y., $27,837.99, Okonite Co., Passaic, N. J., $23,438.60, Rockbestos Products Corp., New Haven, Conn., $18,425, and United States Rubber Co., N. Y., $11,232; *synthetic sodium nitrate:* Barrett Co., New York, $36,075; War, *raincoats:* Sigmund Eisner Co., Red Bank, N. J., $39,300.

The Thermoid Co., Trenton, N. J., last month held its annual stockholders' meeting at which the eight directors were reelected. President Frederic E. Schluter declared the volume of sales to date this year is considerably ahead of that for the same period in 1939 and, unless something unexpected develops, 1940 should be a much better year than 1939. Mr. Schluter further announced that the stockholders had favored the recently adopted profit-sharing program of the firm and had voiced approval of the new wool-spinning plant which has given employment to approximately 250 more persons this year than last.

Standard Oil and Firestone to Produce Buna

Standard Oil Development Co., 26 Broadway, New York, N. Y., has made an agreement with Standard Oil Co. of Louisiana for the erection of a Buna synthetic rubber plant at Baton Rouge, La. Both companies are wholly-owned subsidiaries of the Standard Oil Co. of New Jersey. The plant is expected to begin operations the latter part of this year and will have a capacity of approximately 10,000 pounds per day, which amounts to slightly less than 1,400 long tons annually based on a six-day week. This production amounts to only slightly less than ¼% of the 577,591 long tons of crude rubber consumed in the United States during 1939. The plant will produce both butadiene and the copolymerized product, Perbunan. Acrylonitrile, also a basic material, will not be made at the new plant at the start.

The Firestone Tire & Rubber Co., Akron, O., has consummated necessary licensing agreements with the Standard Oil Development Co. to manufacture its own requirements of Buna rubber, and both Perbunan and Buna S are under consideration for immediate production by Firestone. It is not yet known, however, whether the Firestone company will erect a large plant or draw its principal supplies from the Baton Rouge plant.

One of the other leading rubber companies has already informed Standard Oil that it will draw its supplies of Buna from the Baton Rouge plant, and this plant will also furnish the requirements of the large number of manufacturers of rubber specialties who have been using the imported Buna, supplies of which have been curtailed since the war began.

The Department of Commerce estimates synthetic rubber (neoprene, "Thiokol," Buna, etc.) consumption during 1939 at 1,700 long tons as compared with 814 long tons during 1938.

National Association of Purchasing Agents, 11 Park Place, New York, N. Y., will hold its twenty-fifth annual international convention and Inform-a-Show at Netherland Plaza Hotel, Cincinnati, O., June 3 to 6. In the 75 exhibits constituting the Inform-a-Show a wide variety of products and processes will be displayed, including those of: Eagle Pencil Co., New York; Eberhard Faber Pencil Co., Brooklyn, N. Y.; Garlock Packing Co., Palmyra, N. Y.; Jenkins Bros., New York; and Scovill Mfg. Co., Waterbury, Conn.

Pierce-Roberts Rubber Co., Trenton, N. J., continues to operate with an extra shift. Treasurer Clifford A. Pierce is on a six-week pleasure trip. He left for Los Angeles where he will board a steamer for Honolulu. The return will be by plane from San Francisco, and stops will be made at Salt Lake City and Chicago.

(*Continued on page 72*)

OHIO

Packard Electric Expands

Commemorating fifty years in business, the Packard Electric Division of General Motors Corp., Warren, O., plans adding 75,000 square feet of floor space to provide more adequate facilities for manufacturing operations and much needed room for development of new products as well as modern improved facilities for its 1,000 workers, according to General Manager B. N. MacGregor. The expansion program includes construction of a two-story personnel building and a one-story manufacturing building, demolition of an old two-story office building, modernization of the boiler house, and relocation of the shipping room and docks.

The first floor of the personnel building will house separate locker rooms for men and women, hospital and medical facilities, including an X-ray department, personnel department offices, the plant protection force headquarters, and a lobby and waiting room. On the second floor will be the workers' lunchroom with a floor space of 7,200 square feet, available also for employe activities.

Plans are under way for a civic celebration of Packard Electric's golden jubilee when the new building is completed this summer.

Greater operating efficiency will be afforded through moving the shipping room and docks to allow for continuous operation in a straight line which brings raw materials in at one end of the plant and delivers the finished products to the shipping room at the other end. To make room for the shipping department, an old brick building will be demolished, the last remaining structure of the original group of Packard Electric buildings.

The third building expansion program within five years, the new construction project gives the Packard Electric plant a total of 350,000 square feet of floor space. Expansion in 1936 added 60,000 square feet, and the 1937 project, another 85,000 square feet.

General Tire Appointments

The General Tire & Rubber Co., Akron, through L. A. McQueen, vice president in charge of sales, has reported the following personnel changes. R. L. Countryman, in charge of sales in the Memphis district, has been named Chicago sales district manager, succeeding Roy Doss, assigned to other executive duties. Assistant district manager at Chicago is L. L. Cyganek, promoted from sales representative in the district. Mr. Countryman's successor at Memphis is T. C. Mundy, a sales representative in the district. W. A. Morse, a sales representative in the Chicago district, succeeds the late C. W. Martin, Jr., as Kansas City district manager.

Firestone in Brazil; Announces New Tractor Tire

The Firestone Tire & Rubber Co., Akron, will soon start operations at its new Sao Paulo, Brazil, plant, which has a daily capacity of 500 tires and tubes and provision for expansion. The building is of special concrete construction embodying the most modern ideas. The site, 20 acres in area, is on the country's main railroad line and along a river.

Firestone, with a sales distributing organization in Brazil for the past 22 years, found the steadily increasing demand for its products warranted erection of a local factory. The high protective tariff in Brazil likewise was a deciding factor.

This is the eighth factory built by Firestone in foreign lands. Its other plants abroad are in Canada, England, Spain, Switzerland, Argentina, South Africa, and India.

Tractor Tire for Narrow or Wide Base Rim

Firestone now offers for farm tractors a pneumatic tire featuring a new wide base rim and a dual-purpose tire bead design whereby a standard-size tire is equally adaptable for mounting on either the old narrow base rim or the new wide base rim. When the latter is utilized, the tire is changed from its customary circular shape to an open "U" shape, which greatly increases the cross-section of the tire; adds to the air space; contributes to greater flotation in extremely wet and muddy operating conditions or in loose, sandy soil; results in greater traction efficiency; insures longer wear; and provides additional space for water ballast to increase traction when necessary.

Hydro-Electric Plant in Liberia

For the first time one of West Africa's rivers is being harnessed to bring electric light and power to what was deep jungle a few years ago. Firestone has started construction, to be completed next year, of a hydro-electric plant on the Farmington River in Liberia to supply the needs of the company's rubber plantations of 70,000 planted acres. This new project will supplant Diesel engines now used for power and will eliminate importing fuel oil.

The initial unit of the hydro-electric project will be of 5,000 kilowatt capacity. A concrete overflow diversion dam is being constructed on the site of a natural rapids which has a 70-foot fall in one mile. The water will be diverted into a canal and returned to the river through penstocks and a power house at the foot of the rapids. There is sufficient potential power to establish additional units as and if needed.

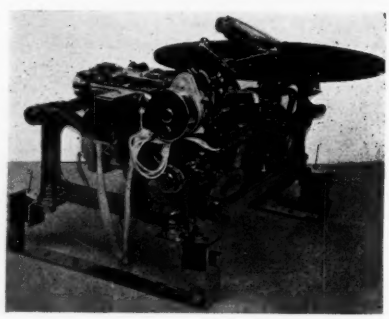
McCoy on Leave

Charles F. McCoy, Jr., Firestone research director, has been granted a year's leave of absence to assist his father in the management of the Trenton Spring Products Co., Trenton, N. J.

Rubber Latex Imports More Than Doubled

Imports of rubber latex rose from 27 million pounds in 1938 to 61 million pounds in 1939 largely because of an increasing use of latex for making cushioning material, according to the Firestone economic research division.

Most of the production of the Firestone plantations in Liberia, West Africa, now is being shipped to the company's factories as latex rather than as sheet rubber. Although requirements for rubber in latex form have expanded rapidly, the Liberian production is meeting demands, for each year additional acreage comes into tapping. This year 38,000 of the 70,000 planted acreage in these plantations will be in tapping. The areas now coming to maturity show excellent production records, Firestone says, as a result of an initial planting program of bud-grafting high yielding stocks which produce two to three times more latex than average rubber trees of most plantations.



Vibro-Insulators, rubber-in-shear mountings made by The B. F. Goodrich Co., Akron, O., are being used by the Cinematone Corp., Los Angeles, Calif., on its penny phones to prevent the transmission of vibration to or from the phonomechanism.

New Goodrich Tires

The B. F. Goodrich Co., Akron, recently announced several new tires. The Goodrich Patrician Silvertown is a passenger-car tire created to provide unusual standards of quiet cushioning and long wear with custom-built appearance. Its tread pattern has flexible "Y" shaped running ribs which, with pliable skid-resisting fins, provide a positive wiping action when brakes are applied for sudden stops. Optional in rayon or cotton construction, the Patrician is said to have greater strength to resist bruises and other road hazards; while a stronger bead construction gives additional ability to withstand severe treatment. Another safety factor, minimizing the hazard of high-speed blowouts caused by heat, is provided by the heat-resisting Golden Ply in the cotton-built Patrician and the rayon cords in the Rayoflex Patrician. The tire also has the reversible "Tuxedo" sidewalls, one white and the other black.

The company is also marketing three new tires for earth moving equipment, each created for specific service conditions. The Earth Service Type, for drive wheels of tractors hauling semi-trailer wagons in soft and muddy going, has self-cleaning cleats in a balanced non-skid tread pattern assuring sure-footed traction. The Rock Service earth mover, for quarry, strip mining, logging, and similar operations and excavating service where much rock must be moved, features a broad flat tread with cleated pattern for traction, and tough sidewall curb strips for additional strength against abuse. The Trailer Service type, for free rolling wheels of scraper buggies, provides flotation, resistance to cuts, snags and bruises, and extra traction.

White Sidewall Cleaner

Goodrich has also created a special cleaner for its reversible "white-and-black" tires. This specially compounded paste is designed to remove safely travel and curb stains from the white sidewalls.

Protective Coating for Conveyor Belting

Conveyer belting, during storage and periods of idleness, may be protected against the deteriorating effects of sunlight and air by a new Goodrich synthetic coating, R-60-T. To test the new composition, samples of conveyer belting with covers under severe tension were coated and exposed for six months to all varieties of weather. At the end of that period none of the coated samples showed any evidence of cover deterioration. The coating can be applied with a brush by the user to old or new belting or at the point of manufacture.

Tire Prices Up

Last month increased tire prices were announced by several leading manufacturers. Higher costs of raw materials caused the Mansfield Tire & Rubber Co., Mansfield, to boost prices on its entire line of passenger car and truck tires by 5 to 7½%. The B. F. Goodrich Co. and the Firestone Tire & Rubber Co., both of Akron, advanced prices to automobile manufacturers from 2½ to 7½% and reshuffled dealer discounts to raise retail prices about 1%. United States Rubber Co., New York, N. Y., also is reported to have set a 6% rise on truck and higher priced passenger car tires.

Goodyear Activities

The annual stockholders' meeting of The Goodyear Tire & Rubber Co., Akron, was held on March 25 with President Paul W. Litchfield presiding.

New Developments for Farm Tractors

A complete line of wide base rims has been introduced by Goodyear to be used on farm tractors for changeover from steel wheels to pneumatic rubber tires.

Goodyear also introduced a new low-priced, farm tractor tire, Type-X Sure Grip, recommended for changeovers on tractors which formerly operated without rubber or on tires of low non-skid pattern. Features of this pneumatic tire, identified by a prominent red seal on each sidewall, include the self-cleaning cleated open center tread identical to that of the regular Sure Grip, and a circumferential rib at the shoulder, to provide increased resistance to scuffing and chafing sidewalls.

The Pioneer Rubber Co., Willard, O., has moved its New York, N. Y., office from 200 to 220 Fifth Ave. Pioneer manufactures toy novelty balloons, latex gloves, Ebonettes household gloves, and Stanzoil industrial gloves of neoprene.

Oak Rubber Co., Ravenna, has appointed two new salesmen for Oak-Hytex balloons. S. W. Timm will represent the company in Chicago and Milwaukee, while Wm. Bullock will cover Ohio, Indiana, and Michigan.

Oak announced a new line of balloons, finished by a new decorative technique, the Hy-Glo process. Pictures on Hy-Glo balloons are printed in four or five brilliant colors, and overall is a varnish-like finish which produces a high luster. First balloons to be finished by the Hy-Glo process are scenic prints, depicting such transportation media as boats, airplanes, trains, and autos in action.

MIDWEST

Use of Koroseal Extended

A new type of baby pants of thin white silk treated with Koroseal has been introduced by the Warren Featherbone Co., Three Oaks, Mich. Attractively packaged in small paper boxes to simulate playing blocks, the pants are now on sale at retail stores throughout the country. As a member of Comprehensive Fabrics, Inc., organized and headed by Joseph A. Kaplan as president, Warren Featherbone has the sole rights for application of the Koroseal process to baby pants and a line of notions, including bowl covers, combing capes, shower caps, and aprons. Comprehensive Fabrics, by arrangement with The B. F. Goodrich Co., Akron, O., merchandises domestic applications of the synthetic. Included among other Korosealed items available are shower curtains, closet and storage boxes, clothes bags, raincoats, umbrellas, sports and golf jackets, yard materials, luncheon cloths, and ironing board pads.

Monsanto Magazine, house organ of the Monsanto Chemical Co., St. Louis, Mo., was judged the best internally sponsored publication in a recent competition conducted throughout the United States by the House Magazine Institute of America, which also honored the Monsanto editor, Howard A. Marple, at a dinner at the Hotel Astor, Times Square, New York, N. Y., on March 31.

George S. May Business Foundation, recently granted a non-profit Illinois charter, has opened offices at 111 S. Dearborn St., Chicago, Ill., and at 122 E. 42nd St., New York, N. Y. Founded by Mr. May as a non-profit, fact-finding organization devoted to the interests of private enterprise, it will maintain research engineers in 18 leading American cities, to conduct a scientific study of the increasing problems which confront business management in its effort to earn profits under modern conditions. The Foundation will be supported by contributions from its board of trustees, and its findings will be made available to business groups and educational institutions without charge.

NEW ENGLAND

M. I. T. Course on Colloids

The Massachusetts Institute of Technology, Cambridge, Mass., has announced the fifth summer program in "Theoretical and Applied Chemistry and Physics of Matter in the Colloidal State," to be held under the direction of Dr. E. A. Hauser, for five weeks beginning June 17, 1940.

Geoffrey L. Moore, late vice president and director of the George C. Moore Co., Westerly, R. I., left a personal estate valued at between $125,000 and $150,000. All his capital stock in the Moore company has been left to a brother, Thomas F., and the rest of the estate to the widow, who has been named executrix.

Rubber manufacturers in Rhode Island, according to statistics from the State Director of Labor, in February showed a slight and seasonal decrease in activity as compared with January, 1940, and February, 1939, but payrolls were up. Employes in February totaled 4,085, against 4,274 in January and 4,121 in February, 1939. Payrolls for February totaled $314,000, against $300,000 in January and $310,000 in February, 1939. Electric power consumed for the three months, respectively, follow: 2,343,000, 2,469,000, and 2,209,000 kilowatt hours.

Providence Rubber & Gasket Co., Inc., 38 Church St., Pawtucket, R. I., has changed its name to White Packing & Rubber Co., Inc.

OBITUARY

Dr. D. D. Roberts

DUDLEY D. ROBERTS, president of Rubatex Products, Inc., a patent-holding company, 420 Lexington Ave., New York, N. Y., died on March 8 of a cerebral hemorrhage. Born in Newark, N. J., in 1874, he was graduated from Columbia University in 1898 with an M.D. degree. He was attending physician at Brooklyn Hospital from 1910 to 1919, a professor of gastro-enterology at Long Island College, a major in the Medical Corps, 1917 to 1919, consultant on internal medicine in New York from 1920 to1930, a consultant on public health service and hospitals, and chief of the executive committee of Neurological Institute for five years. Dr. Roberts retired from the practice of medicine in 1930 and devoted his time to finance and to work on patents, inventions, and projects. He was also president of Gotham Investment Corp.

The deceased belonged to Racquet & Tennis, Garden City Golf, Maidstone, National Golf, Grolier, and Everglades clubs.

Private funeral services were held on March 10. He leaves a wife, two sons, and two daughters.

Charles R. Boggs

AFTER a lengthy illness Charles Reid Boggs succumbed on April 1. He was vice president, general manager, and a director of the Simplex Wire & Cable Co., Cambridge, Mass., which he had joined as chemist in 1906. Advancements followed: factory manager, 1918; vice president, 1930; director, 1934; and general manager, 1936.

Mr. Boggs was very active and well known in both the cable and the rubber industries. He had a share in the discovery of vulcanization accelerators and held the original patents in this country. Besides he was the discoverer of the vulcanizing effect of selenium and also patentee of the use of deproteinized rubber in cables designed to resist water absorption. He was the author of innumerable technical papers and held many patents, both on rubber and cable constructions and processes.

The deceased was born on November 22, 1883, in Nashville, Tenn. He went to the public schools in Washington, D. C., and then to Massachusetts Institute of Technology (B.S., 1905), where for one year he was an assistant in electro-chemistry.

He was a very active member of the Rubber Chemistry Section, A. C. S., and a founder of its successor, Division of Rubber Chemistry, serving as chairman in 1925. Mr. Boggs likewise organized the Boston Group of the Rubber Division in 1928 and became its first chairman. He was also a Fellow of the Institution of the Rubber Industry, London, England, and of the American Society for the Advancement of Science,

Charles R. Boggs

a member and former vice president of the American Chemical Society, a member of the American Society for Testing Materials and a former vice chairman of its Committee D-11 on Rubber Products, a former vice president of the M. I. T. Alumni Association, vice president of the Cambridge Chamber of Commerce, and of the Cambridge Industrial Association, and a trustee of the Cambridgeport Savings Bank. In addition Mr. Boggs belonged to the American Institute of Chemical Engineers, American Institute of Electrical Engineers, Brae Burn Country Club, and Sigma Alpha Epsilon.

He leaves his wife, a son, a daughter, a sister, and two brothers.

Funeral services were conducted on April 3 in Union Church, Newton Center. Private burial followed.

A. D. Usow

ON MARCH 26, after a lingering illness, died Abraham David Usow, president and treasurer of the Usow Rubber & Mfg. Co., Oostburg, Wis., and of the Badger Raincoat Co., Port Washington, Wis. The deceased, who was born in Russia 48 years ago, belonged to the Masonic order, Knights of Pythias, Rotary Club of Port Washington, Milwaukee Athletic and Woodmont Country clubs, and Temple Emanu-El-B'nai Jeshurum. He leaves a wife, a daughter, a son, three brothers, and three sisters.

The funeral was held from Weiss Chapel, Milwaukee, on March 29, with interment in Spring Hill Cemetery.

L. A. Williamson

LEONARD A. WILLIAMSON, 38, who retired in September because of ill health after several years as superintendent of the bare wire division, General Cable Corp., Pawtucket, R. I., died on March 30. Survivors include his wife, his mother, two brothers, and a sister.

William J. Gallagher

WILLIAM JOHN GALLAGHER, noted planting authority, died in London, England, on March 28. Born in County Tyrone, Ireland, in 1878, he was graduated, an M.A. with honors, from the National University at Cork and then took post-graduate work in forestry at several colleges on the Continent. In 1906 he became mycologist of the Federated Malay States and three years later Director of Agriculture.

In 1910 Mr. Gallagher helped start the plantations of the United States Rubber Co., New York, N. Y., in Sumatra and was made a vice president and a director of U. S. Rubber Plantations, Inc., resigning on July 1, 1927, to leave the Far East. He also had been a managing director of Holland-American Plantations Co. and Malayan-American Plantations, Ltd.

Returning to London, he served as an adviser and a director of numerous rubber growing companies and was very active, often holding office, in several organizations, including Rubber Growers' Association, Rubber Regulation Committee, Rubber Producers' Research Association, British Rubber Research Board, and Research Association of British Rubber Manufacturers. The deceased was prominent in the present International Rubber Regulation Agreement and had written much on planting.

A. O. Matsner

AFTER a short illness Mrs. Augusta O. Matsner, reported the first woman crude rubber importer in New York, died at her home in Minneapolis, Minn., on March 27. She leaves a daughter.

A. W. Vennema

AUGUSTUS WHITON VENNEMA, mechanical superintendent of The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., died on March 23 after a long illness. He had joined Manhattan in 1909, winning many promotions, to become mechanical engineer in charge of maintenance a decade ago.

Mr. Vennema was born in Kalamazoo, Mich., May 13, 1887. The family moved to Passaic, where he attended grade and high school and Stevens Preparatory School. The deceased is a graduate of Stevens Institute of Technology (M.E., 1909).

For several years he was very active in the American Society of Mechanical Engineers. He also belonged to Beta Theta Phi and Kenilworth Society of Passaic. During the World War he was a lieutenant in the Chemical Warfare Service of the United States Army.

Survivors include his wife, two sons, and two sisters.

Funeral services were held at his late residence in Ridgewood, N. J., on March 25. Burial was in Cedar Lawn Cemetery, Paterson, N. J.

Joseph H. Dunlap

SUFFOCATION in a fire in his apartment in Sahaganj, India, caused the death, a month before he was due back in Akron, of Joseph H. Dunlap, temporarily factory technical representative in India for The Goodyear Tire & Rubber Co. He was an engineer in charge of the interplant section of the company's development department and had been with Goodyear, except for a few years, since 1911.

Mr. Dunlap was born in Washington, Pa., 54 years ago. He was graduated from Washington & Jefferson in 1907 and from the Massachusetts Institute of Technology in 1911. He was an active member of the Westminster Presbyterian Church, a former member of the Akron University Club quartet, and active in the Boy Scouts and the Y. M. C. A.

He is survived by his wife, a son, his mother, and a brother.

The body was cremated after Presbyterian services in Calcutta. Memorial services were held in the Akron church also.

Charles W. Gramm

ON APRIL 14, Charles Wm. Gramm, 62, vice president and director, Zophar Mills, Inc., 112-30 26th St., Brooklyn, N. Y., died at his home in Cranford, N. J., of a heart attack. He had been in the engineering department of the City of New York until 1913 when he became active in the chemical industry. In 1924 upon the incorporation of the old firm of Zophar Mills he became vice president and director. Mr. Gramm was a charter member of the Brooklyn Historical Society. He leaves a wife and a daughter.

CANADA

Industrial Accident Prevention Associations, 600 Bay St., Toronto, Ont., held its Silver Jubilee Safety Convention and Safety Exhibit at Royal York Hotel, Toronto, on April 22 and 23. Among the speakers were Vincent E. Pendleton, safety engineer, General Electric Co., West Lynn, Mass.; Col. John Stilwell, president, National Safety Council, Chicago, Ill.; David Smith, engineering department, Ford Motor Co. of Canada, Ltd., Windsor, Ont.; and Arthur C. Horrocks, of Goodyear Tire & Rubber Co., Akron, O., who was introduced by R. C. Berkinshaw, general manager and treasurer of Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont. Among the nine class safety associations that comprise the Industrial Accident Prevention Associations is the Leather, Rubber and Tanners Safety Association.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., through President A. G. Partridge has announced that total sales and profits for the first quarter of 1940 are well above those of the corresponding period last year although export sales are down because of war conditions affecting foreign trade, such as quotas, greatly increased exchange and shipping expenses as well as other restrictions.

Charles S. Watson, for many years Goodyear advertising manager, joined the sales department of Canada Bud Breweries, Ltd., Toronto, Ont.

Tourists' Troubles Denied

A letter, dated April 2, 1940, by F. J. Jackson, president, Canadian Automotive Wholesalers' Association, Ottawa, Ont., Canada, and sent to the Motor & Equipment Manufacturers Association, New York, N. Y., denies emphatically several false rumors being circulated among the automotive trade in the United States.

"The first rumor has it that it is difficult to gain admission to Canada. The second, that tourists' automobiles are subject to confiscation in Canada; and third, tourist money is subject to confiscation. Fourth, that men of military age are liable to be shanghaied."

Canada this year is doing all in its power to encourage American visitors, and propaganda as above is extremely detrimental.

FROM OUR COLUMNS

50 Years Ago—May, 1890

Nathaniel C. Mitchell, of Philadelphia, has secured letters patent (Serial No. 332,455) for a new method of production of restored rubber, which includes devulcanizing the waste rubber by the action of live steam. (p. 150)

It is estimated that there are more than 120 rubber manufacturers in the United States, employing 15,000 hands producing annually 280,000 tons of goods valued at $260,000,000. (p. 152)

Here's a new use for rubbers: A female lawyer in Chicago, being ordered out of a court-room by the janitor, pulled a rubber sandal from her foot and gave him a sound drubbing. (p. 154)

The first rubber-soled shoe for sporting purposes was made in France and became at once popular. It is said that in this country the first pair were made by the New Brunswick Rubber Co. for Peck & Snyder of New York. (p. 154)

The only tennis ball made in the United States is that manufactured by the New York Rubber Co. for Peck & Snyder. (p. 154)

The consumption of rubber in the United States in 1889 was estimated at 31,000,000 pounds, against only 19,000,000 pounds for 1880. (p. 155)

Recent investigations made with a view of overcoming the difficulties caused by vibration and noise from dynamos and engines, have led to giving special stress to an increase of the mass of machinery to be isolated and its carriage by an elastic body, such as rubber. (p. 162)

25 Years Ago—May, 1915

To successfully measure the properties named, the Elastometer for elasticity, and the Durometer for hardness, have been devised by the Shore Instrument & Manufacturing Co. (p. 430)

The Imperial Government of Germany offers a prize of 100,000 marks ($25,000) to the inventor of a satisfactory process for regenerating rubber. (p. 443)

In 1858 the late John J. Fields established the Elastic Cone Spring Co., in New York City, for the manufacture of rubber car springs. Later the company moved over to Jersey City and was reincorporated under the name of the New Jersey Car Spring & Rubber Co. After the spiral coil spring was invented and rubber car springs had gone out of use, the company manufactured mechanical goods. (p. 450)

A recent number of the *India Rubber Journal* contains the following: "Since the Dutch Government has forbidden the export of tires, short motor trips into Germany have become quite popular. Many cars which cross the frontier with a set of new tires return with them utterly worn out, after a small mileage only." (p. 462)

U. S. Crude and Waste Rubber Imports for 1940

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1940	Totals 1939	Balata	Miscellaneous	Waste
Jan. .....*tons*	68,832	2,768	406	161	74	255	72,496	39,082	107	648	241
Feb.	40,338	1,458	553	453	30	256	43,088	36,490	75	316	34
Mar.	56,008	2,720	119	49	42	320	59,258	38,989	89	659	26
Total 3 mos., 1940 .....*tons*	165,178	6,946	1,078	663	146	831	174,842	.....	271	1,623	301
Total 3 mos., 1939 .....*tons*	107,291	4,869	1,028	612	16	745	.....	114,561	139	2,137	411

Compiled from The Rubber Manufacturers Association, Inc., statistics.

EUROPE

GREAT BRITAIN

Possible Wartime Uses of Rubber

In "New Uses of Rubber in Wartime" in a recent issue of the London *Rubber Age*, H. C. Young points to various factors impeding the use of rubber in new directions. Outside of the rubber industry, he states, little understanding exists of rubber and its possibilities. Moreover, in applying rubber to new uses, there is often a lack of attention to essential details which causes failure of the rubber and brings it into disrepute.

He directs his remarks chiefly to the chemical industry and says: "If only a hundredth part of the effort put forward to develop, say, the heavy bus tire, or the airplane tire was put into the development of rubber for general use in the chemical trade, many tons of material a year could be manufactured."

In time of war certain materials essential for defense, such as aluminum, steel, and stainless steel, become hard to obtain. Mr. Young suggests some directions in which rubber could replace these materials with advantage. In chemical plants semi-hard rubber compositions could serve instead of steel to make trunking; rubber could replace aluminum where it is used in containers, lids, and brackets; rubber flooring would be better than asphalt floors where first cost is not the deciding factor, for though asphalt is resistant to acid, it does not resist abrasion or pressure well. Rubber coatings would be more useful than concrete to protect the main structure of a building from fume effect. Instead of lined steel or lead piping, rubber piping would be effective and cheap; instead of wood, more use should be made of rubber for sleeves and loose liners.

I.R.I. Meetings

The following are recent meetings and lectures held by various district sections of the Institution of the Rubber Industry:

March 18. Manchester. "The T-50 Test as a Control of Factory Cure," by Dr. E. R. Gardner. "Electrical Tests and Problems Associated with Cure," J. R. S. Waring.

March 18. Birmingham. "The Manufacture of Anti-Vibration Products with Particular Regard to the Automobile Industry," C. E. Pearce.

April 1. London. "Costing in Relation to Factory Control and Administration," F. C. Lawrence.

April 3. Leicester. Annual general meeting and a paper: "Factors Affecting the Processing of Neoprene," R. B. Clarke.

Notes

An amending order dated February 22, 1940, and effective March 1, 1940, has been issued by the Board of Trade, which provides that certificates of origin and interest are no longer required for imports of rubber tires and inner tubes into the United Kingdom.

Manufacturers of various types of rubber goods, especially hose, in the Manchester area are swamped by large government and civilian orders. Firms are working night shifts; nevertheless deliveries have been very slow to wholesalers and retailers. The latter complain that their business consequently is suffering and urge the rationing of supplies.

British rubber consumption in the four months from October, 1939, to the end of January reached record figures, averaging 11,000 tons a month, against less than 10,000 tons a month in the first eight months of 1939.

London crude rubber prices, for a time below those in other rubber markets, affected shipments to this country, and in November and December, 1939, only 2,630 and 2,464 tons, respectively, were sent here from Malaya. However the situation was soon reversed; the small shipments plus increased consumption ate into reserves, and before long rubber prices in London were higher than elsewhere, and more raw rubber arrived. In January, 1940, Malaya shipped 5,297 tons, and in February, 9,864 tons.

FRANCE

Power of Caoutchol

After reviewing certain patents for producing elastic, vulcanizable products by impregnating tar, oils, etc., with rubber, H. Leduc[1] refers to the recent works of K. C. Roberts which showed that among the constituents of natural rubber is one designated caoutchol that apparently is responsible for the elasticity of natural rubber, since rubber from which caoutchol had been removed was merely plastic, not elastic. Mr. Leduc reasons that it is hardly probable that the power of caoutchol to confer elasticity is limited to a single hydrocarbon, rubber, and suggests that it would be interesting to see whether a plastic material like mineral rubber, for instance, could not be transformed into an elastic mass by the addition of 2 or 3% of caoutchol.

Ultra-rapid Oxidation Test[2]

In earlier works Ch. Dufraisse and J. Le Bras showed that the oxidizability of rubber was influenced by various circumstances or errors arising in the course of compounding or vulcanization; they developed a method of testing rubber by comparing, with the help of a manometer, the rate of oxidation of various samples of rubber with a standard. The earlier tests were carried out at 80° C., at which temperature the mercury in the manometer tubes mounts relatively slowly so that several hours must elapse before a definite result is obtained. Now these writers have found that for practical purposes it is possible to make a rapid test within 15 minutes if the temperature is raised to 120° C. The results thus obtained are sufficiently definite to indicate the presence of any harmful impurity in the mix, or whether some error in compounding has been made, especially whether the antioxygen is deficient in quantity, badly distributed, or lacking altogether—faults which hardness and density tests would not show.

[1] "About Synthetic Rubber," *Rev. gén. caoutchouc*, Jan., 1940, p. 8.

[2] "Ultra-rapid Control of Rubber: Oxidation Test in a Quarter of an Hour." *Ibid.*, pp. 9-13.

Rubber Congress in Paris

A Franco-Britannic Rubber Congress has been planned for May 16, 17 and 18 at the Grand Palais, Paris. Various French associations, the Institution of the Rubber Industry, and the British Rubber Producers Research Association are participating in the congress to be devoted chiefly to raw rubber production.

The Paris Trade Fair will take place this year as usual, from May 11 to 27.

GERMANY

Improving "Thiokol" Latex

Since "Thiokol" A is extraordinarily resistant to solvents, it can only be molded and not used for spreading or dipping. Attempts to use it in the form of an aqueous suspension have hitherto been unsuccessful, for unlike rubber latex, "Thiokol" latex does not form satisfactory films with good adhesive power. Recently, however, two promising processes[1] have been developed by which it seems, "Thiokol" latex can be obtained having the necessary film-forming and adhesive properties. According to the first method, the aqueous "Thiokol" suspension is prepared as usual, but at the conclusion of the reaction all but 0.5 to 1% of the dispersion agent (magnesium hydroxide) is removed, that is, only just enough $Mg(OH)_2$ is retained to prevent coagulation.

The second method consists in chemically reducing the size of the molecules, with care being taken to preserve the elastic, rubber-like condition. "Thiokol" latex obtained by the above methods is said to form elastic and adhesive films which have all the good qualities of "Thiokol" itself. The latex is a yellowish, aqueous suspension that can be concentrated to a dry content of 80% or diluted with water as desired. It can be mixed with the usual fillers, vul-

[1] G. Kallner, *Chem. Fabrik*, 12, 418 (1939).

canizing agents, colors, etc., but the amounts that may be added are substantially lower than for rubber latex. The preparation is vulcanized in its latex form or after application; vulcanization increases impermeability and strength. For best results vulcanization takes place for 30 to 60 minutes at 140° C. under a pressure of three atmospheres.

"Thiokol" latex mixes, applied by brush or spray gun, by spreading or dipping, are successfully used for protective coatings and linings on large iron or reenforced concrete containers for holding oils, acids, etc., for making impregnated woven beltings, gloves, protective garments, and as paints for weatherproofing and insulating buildings.

Rubber Association Meets

On January 12, 1940, the Rhein-Westphalian District Group of the Deutsche Kautschuk Gesellschaft met at Leverkusen, when several scientists of I. G. Farbenindustrie discussed some of the firm's products and problems connected with their use.

Dr. Hagen considered degradation of Buna S and Buna SS to facilitate processing of these materials. Dr. Gartner revealed that the I. G. concern had developed a stabilizer, LS1, to be added as soon as possible after degradation to prevent the tendency of Buna S to regain its original stiffness. The stabilizer is at present intended only for hard rubber. Buna SS, still in the experimental stage, was Dr. G. Schmidt's subject. He stated that this product is more thermoplastic than Buna S and hence easier to work. It will shortly be produced on an industrial scale.

Two methods of improving the adhesion of rayon tire cord were described by Dr. Dane: (1) impregnating the cord with latex and albumens, especially casein and haemoglobin; (2) impregnating with latex and resins capable of hardening, e.g., resorcinformaldehyde. It was shown that cord, and also cell wool, treated with latex plus 10% casein, had about the same adhesion as untreated cotton thread.

Dr. Schafer discussed a new I. G. product, Koresin, designed to be applied to surfaces to improve the adhesion of mixes in spreading, impregnating, etc.

Leipzig Spring Fair, 1940

The 1940 Leipzig Spring Fair, held March 3 to 11, is reported a remarkable success, considering the present situation. The German rubber industry, as usual, was well represented and booked many orders from foreign as well as local buyers. Incidentally, it must be remembered that since Germany is anxious to retain her foreign markets as far as possible, restrictions regarding the use of raw materials in many cases do not apply where the finished goods are to be exported.

The display of articles made from Buna and other synthetic materials was greater than ever. Among the firms which especially featured Buna goods were: Zieger & Wiegand, A.G., ice-bags, hot water bottles, air cushions, surgeon's gloves, etc.; Deutsche Kabelwerke, A.G. (which uses Buna for everything), tires, tubes, cables, nipples, hospital sheeting, aprons, technical gloves; Rekord Gummifabrik, sponge and foam rubber goods made of 100% Buna; C. Muller Gummiwaren, A.G., bathing accessories, gloves, aprons and panties.

"Adrettin," a new synthetic product, is claimed to have good resistance to chemicals as well as to tearing and stretching. The Niedersachsische Gummiwarenfabrikation showed a variety of traveling, bathing, and sponge bags as well as panties made of the new material.

EUROPEAN NOTES

Soviet Russia

Since 1928 production efforts in the Russian rubber industry have been centered mainly on the manufacture of automobile tires instead of footwear, as in former years. According to *Frankfurter Zeitung,* annual production of rubber footwear is now estimated at 90,000,000 pairs, whereas requirements are put at 140,000,000 to 150,000,000 pairs.

The manufacture of automobiles and automobile tires increased considerably from 1933 to 1938; synthetic rubber is being used in increasing amounts, and imports of natural rubber are declining. According to published figures, production of synthetic rubber in 1938 was double the Russian imports of the natural article. The following table indicates the developments in production of automobiles, automobile tires, synthetic rubber, and imports of natural rubber from 1933 to 1938, inclusive.

Year	Automobile Production Number	Tire Production Number	Crude Rubber Imports Tons	Synthetic Rubber Production Tons
1933 ..	49,700	672,000	30,800	2,204
1934 ..	72,500	1,535,000	47,000	11,139
1935 ..	97,400	2,077,000	37,600	25,581
1936 ..	138,000	2,198,000	31,000	44,200
1937 ..	193,000	3,000,000	30,400	25,000
1938 ..	208,207	3,700,000	26,219	53,000

The great difficulties experienced in connection with the use of synthetic rubber seem to be poor adhesion and lack of uniformity of the product, faults largely responsible for the high percentage of defective tires. But the efforts to improve quality continues unceasingly, and conditions are now hardly as bad as they were painted in a book published in England last year, "Red Pilot, Memoirs of a Soviet Airman," by Vladimir Unishefsky, where we learn that, "On a hot summer day the roads are strewn every two or three yards with pieces of rubber often the size of half a tire," and that road conditions both in town and country are so bad as to "make it impossible for a tire to last even as long as three months, whereas according to the 'plan' it may not be changed for a year."

Rumania

The Banloc Rubber Goods Factory, Bucharest, which started making automobile tires last year at its factory at Baicoi, has doubled its capital to 200,000,000 lei.

Holland

Hitherto *Rubber,* the organ of the Rubber Foundation, Amsterdam, has been supplied gratis. But owing to the great demand the directors of the foundation have decided to take steps to insure that the paper reaches only those genuinely interested in it; thus new readers will pay a nominal subscription price, 1.50 guilders.

Denmark

The Dansk Galocj & Gummifabrik A.S., Copenhagen, reported net profits of 856,833 kroner for 1939, against 892,957 kroner for 1938. A 15% dividend was again paid, leaving 537,640 kroner to be carried forward. The concern increased output during the year and employed 1,049 persons, against 983 in 1938, paying in wages 3,270,000 kroner, against 2,880,000 kroner.

The A. S. Nordiske Kabel & Traad Fabrikker, Copenhagen, made net profits of 3,390,000 kroner in 1939, about 900,000 kroner more than in 1938. The dividend was again 10%, plus a 2% bonus. A total of 966,713 kroner was carried forward.

FAR EAST

THAILAND

Rubber exported from Thailand is subject to an export duty of 7% ad valorem based on average prices officially fixed from time to time for the different classes of rubber.

BRITISH INDIA

Production of automobile tires and tubes began January 20, 1940, at the new tire plant at Sewree, near Bombay, built for a subsidiary of an American tire manufacturer. At present the maximum daily capacity is 1,000 tires. The staff now includes 24 Americans, but during the next two years most of them will be replaced by Indians.

NETHERLAND INDIA

Swelling of Vulcanized Rubber

At the General Experiment Station of the A.V.R.O.S., Dr. N. H. van Harpen, who has been examining the factors influencing the swelling of vulcanized natural rubber in organic media, recently published results of these preliminary experiments.[1] The investigation so far has centered chiefly on the effect on swelling of: (1) size of the rubber particles in the latex; (2) non-rubber substances in the latex, especially the hydratant acid indifferent to swelling agents and having the property of intimately uniting with the rubber particles; (3) vulcanization period; (4) fillers (carbon black).

For the tests four types of rubber were used: Type A, made from latex cream having dry rubber content of 62% and non-rubber content of 1.03% calculated on the dry rubber; B, made of normal latex having D.R.C. 33.4% and 2.35% non-rubber substances; C, made from serum or skimmed latex (left after creaming latex by centrifuging) having D.R.C. of 7% and 9.8% non-rubber substances; D, also made from serum, but before coagulation 100% hydratant acid (calculated on the dry rubber) was added; after washing, however, the non-rubber substances amounted to 41.3%.

The samples were all compounded in the same way; the only difference was that 170 parts of D rubber were used, against 100 parts for the other rubbers. One set of samples was loaded with 100 parts of P-33 carbon black; while in the other set carbon black was omitted.

Tests showed that by using the under latex left after concentrating latex by centrifuging, it is possible, with or without the addition of hydratant acid, to make a vulcanizate that swells considerably less than vulcanizates made from normal rubber. Whether still better swelling results could be obtained with latex from other varieties of *Hevea* (*guyanensis, collina spruciana*) having smaller particles (less than 0.5μ) and what the effect of vulcanization accelerators would be on this material are still open questions.

Rubber in New Guinea

The work of opening up the government's rubber plantation, Ransiki, in New Guinea, started a little over a year ago, is reported to be progressing favorably. Already about 200 of the 1,000 hectares have been planted with high-grade material. Nurseries covering an area of 12 hectares have been laid out, from which it is expected to obtain ample material to plant the remaining 800 hectares with buddings before the end of the current year. After another five years the first crops from this territory may be expected.

It was no little task to open up this virgin territory in New Guinea in such a comparatively short time, for not only did the land have to be cleared, and buildings for the staff put up, but a road 13 kilometers long had to be built to the nearest outlet on the coast. It is planned to extend this road a further five miles to reach a spot more suitable for shipping.

The labor force consists of a nucleus of Javanese with experience on estates in Java and Sumatra; while the rest are Papuans. The latter are apparently proving useful workers, and labor problems seem solved.

Exports of Rubber and Latex

Exports of rubber from Netherland India in January, 1940, were unusually high, according to the Central Bureau of Statistics. Estate rubber from Java and Madura came to 6,540,398 kilos, including 77,772 kilos of latex and 77,601 kilos in the form of manufactures. Estate rubber shipments from the Outer Provinces were 14,109,798 kilos, including 1,475,565 kilos of latex. Native rubber exports from the Outer Provinces were 34,447,563 kilos. The rubber shipments from all Netherland India in January, 1940, totaled 55,097,759 kilos.

MALAYA

War Export Tax

While higher quotas and higher prices for rubber are raising the profits of rubber growers, their gains are to a certain extent offset by higher prices for estate supplies, higher wages, and freight rates. In addition are new taxes. The Straits Settlements and the Federated Malay States are levying an extra war export tax of 2½% ad valorem on rubber and tin. This duty is not payable by rubber and tin companies registered in the United Kingdom and, therefore, liable to British income and other taxes. The new tax, effective April 1, and to continue to the end of 1940, when it is renewable, is thought to be applicable to 62% of the domestic exports.

Plywood Cases

A large proportion of the plywood cases used in packing rubber before the war was imported chiefly from Finland and Japan. In 1939 it became increasingly difficult to obtain these foreign cases, and at present it is practically impossible to get them. Prices have naturally advanced, especially since the outbreak of the war in Europe.

Malayan Collieries, for some time manufacturing plywood cases locally, is reported planning to increase its output 300% during 1940 and will probably produce about 1,000,000 of these cases.

Exportable Allowance Cut

The decision of the International Rubber Regulation Committee to maintain the exportable allowance at 80% for the second quarter of 1940 caused no surprise here as such a rate was rather generally expected. But Malaya will have a domestic cut of 2½% in the exportable allowance to adjust the difference between the country's basic quota of 642,500 tons for the year and total assessments on estates, which are higher than the quota. The Controller of Rubber has therefore fixed the rate of release for the second quarter at 77½% of one-fourth of the standard yearly production for all holdings in Malaya. It is likely that the cut will be continued in the third and fourth quarters of the year to prevent an excess of exports over the permissible exportable amount.

The I.R.R.C. has further decided to continue to permit unconditional replanting throughout the period of the international agreement. But though the terms of the agreement for the period January, 1939-December, 1940, permit additional new planting up to 1% of the total area, no additional new planting will be permitted.

Labor Troubles

The rise in the prices of Malaya's chief commodities and the increased cost of living caused labor unrest throughout the country which also spread to estate coolies. Several small strikes occurred for higher wages, which in most cases were settled. In certain districts the rates for Indian laborers have been raised to $0.55 (Straits currency) a day for men and $0.50 for women. Chinese tappers on one estate demanded and won $0.85 a day instead of the $0.65 they had been receiving. Usually Chinese tappers work on a contract system, in which case their average daily pay is estimated to be around $0.88.

BRAZIL

Local consumption of crude rubber has been increasing steadily in the last few years. The Amazon Valley shipped 1,045 tons to southern Brazil in 1934, 2,234 in 1936, 3,057 in 1938, and 4,065 tons in 1939. Brazil's rubber manufacturing industry is expanding rapidly, and it is expected that she will be able to absorb a large part of the raw rubber that she normally would have sent to Germany.

[1] "Preliminary Investigation of the Swelling of Vulcanized Natural Rubber in Organic Media." Communication from the General Experiment Station of the A.V.R.O.S. No. 114. Reprinted from *Arch. Rubbercultuur*, 23, 4, 232-38 (1939).

Editor's Book Table

BOOK REVIEWS

"Rubber Latex." H. P. and W. H. Stevens. Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y. 1940. Cloth, 5½ by 8½ inches, 224 pages. Indexed. Price, $2.

This book is a reprint of the fourth edition of a paper-bound publication of the same name, issued by The Rubber Growers' Association in 1936. No new data or revisions are incorporated in the present American edition. The text portion of the book, 82 pages in length, deals briefly with the properties, composition, stabilization, concentration, compounding, processing, and applications of latex. The remainder of the book contains brief abstracts of nearly 1,000 selected British patents, covering the period 1920 to 1935. There are indexes to text, patents, and patentees.

"A.S.T.M. Standards—1939. Part III, Nonmetallic Materials—General." American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Cloth, 6 by 9 inches, 1195 pages. Indexed. Price $8.

Formerly the A.S.T.M. issued an annual Book of Tentative Standards, with the Book of Standards published every three years. Now they are combined in the present three-year publication with supplements to be issued in 1940 and 1941. Thus the present work, issued in three parts, contains all of the Society's specifications, standard and tentative.

Part III, which contains 245 separate specifications, methods of test, definitions, etc., covers the following: coal and coke, petroleum products and lubricants, electrical insulating materials, plastics, rubber products, textile materials, paper and paper products, soaps and other detergents, naval stores, water, thermometers, and general test methods. The section on rubber products includes: general methods, hose and belting, gloves, matting and tape, wire and cable, rubber cement, sponge rubber, and hard rubber products.

"The Merck Index." (Fifth Edition, 1940). Compiled and published by Merck & Co., Inc., Rahway, N. J. Imitation leather, 6 by 9 inches, 1060 pages. Price $3.

The fifth edition of this encyclopedia of chemicals and drugs is twice the size of the fourth edition, which appeared ten years ago. In the present edition will be found 5,900 descriptions of individual substances; 4,500 chemical and clinico-chemical reactions, tests, and reagents by author's name; and other informative scientific data. Information on individual materials includes: source, composition, properties, and use in industry and medicine. The volume should be a valuable addition to the industrial research worker's library.

"The Tools of the Chemist. Their Ancestry and American Evolution." Ernest Child. Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1940. Cloth, 5¾ by 8½ inches, 220 pages. Illustrated. Indexed. Price $3.50.

In these pages are chronicled for the first time the events which led up to the creation of the American scientific apparatus business. There are three parts—the first deals with people and events in American chemistry; the second and largest is concerned with the ancestry and development of American chemical apparatus; while the third part is devoted to the distributers of laboratory apparatus. The role that rubber played in apparatus development is not neglected, and several interesting anecdotes tell of rubber tubing and stoppers in their early days.

"Manual for Executives and Foremen." E. H. Schell and F. F. Gilmore. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y. 1939. Cloth, 4⅞ by 7⅜ inches, 185 pages. Indexed. Price $2.

This book is aimed at assisting production officials, from superintendent to foreman, in the improvement of operating methods and controls in order that costs may be decreased and quality bettered. A series of tested methods for locating sources of process improvement in the workplace, the work, and the worker is presented. Suggestions are offered for discovering better ways of controlling quantity, quality, equipment, and stores. A final chapter provides additional references for further study; while an appendix shows a typical process flow chart and diagram before and after improvement.

NEW PUBLICATIONS

"Barrett Chemicals for Industry." The Barrett Co., 40 Rector St., New York, N. Y. 36 pages. An industrially classified listing of the firm's coal-tar chemicals including those suited for rubber compounding is followed by concise descriptions and indicated uses, in this pocket-size booklet. The rubber compounding ingredients described, which range from thin oils to hard solids, find diversified application in compounding.

"Bristol Multiple-Spline Socket Set Screws and Socket Head Cap Screws. Catalog 838." The Bristol Co., Waterbury, Conn. 16 pages. This catalog contains information on prices, sizes, and design of the firm's multiple-spline socket screws for many machine applications, particularly where rotary power is being transmitted.

"Revertex Concentrated Latex." Revertex Corp. of America, One Main St., Brooklyn, N. Y. 24 pages. This booklet describes the firm's four types of latex: standard Revertex, T-Revertex, B-Revertex, and normal latex. Information on supply, containers, storage, uses, and compounding is included, together with an appendix containing several helpful compounding formulas.

"The Vanderbilt News." R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 32 pages. This issue of the *News* is concerned with the principles involved in the production of low-heat generating compounds. The compressed rolling ball test upon which the test results are chiefly based is described. Compounds and test data cover the effect of the following on heat generation: acceleration, time of test run, various fillers, softeners, and time of cure. The Goodrich flexometer and the Dunlop pendulum machine for measuring energy loss are also described.

"Industrial Research and Changing Technology." G. Perazich and P. M. Field. Federal Works Agency, Work Projects Administration, Washington, D. C. 81 pages. This report presents data on the growth of industrial research in this country since 1920, analyzes the industrial and geographical distribution of these activities, and discusses their concentration within industries in relation to the types of problems involved. The statistical data are based on the several surveys made by the National Research Council during the period from 1920 to 1938. Particular attention is given to the rubber industry, which ranks high in industrial research activities.

"Light for Work." The Acme Electric & Mfg. Co., Cuba, N. Y. 8 pages. This bulletin explains the characteristics of mercury vapor lighting and describes the firm's mercury vapor transformers. Charts and tables are included as an aid in determining the necessary amount of light for various types of buildings and work.

"Protovac Modified Caseins and Caseinates." Casein Co. of America, Division of the Borden Co., 350 Madison Ave., New York, N. Y. 50 pages. The casein products described in this booklet are made by a patented process which chemically modifies the original casein in such a way as to give it new and improved properties. Technical information on different grades of Protovac, tables and curves showing the results of laboratory tests, and suggestions for the use of the various products are given. Some of the grades are suggested for use in latex as a thickener, stabilizer, and as an adhesive factor. Flexibility through the use of plasticizers is discussed, and the high tolerance for formaldehyde of certain of these products is emphasized. Formaldehyde treatment of Protovac is said to produce high water resistance.

"Readco Chemical and Industrial Equipment." Read Machinery Co., Inc., York, Pa. 20 pages. This bulletin illustrates and describes typical examples of the firm's line of chemical and industrial equipment, which includes weighing hoppers, sifters, material handling equipment, mixers of various types, and fabricated vessels.

"Where to Find the New Trade Names." A bibliography compiled by Alice M. Amoss, Technical Library, Edgewood Arsenal, Edgewood, Md. Price 75¢. 32 pages. This compilation lists bibliographical sources of information describing various product groups classified under broad subjects following industry lines and covers a wide range of classifications including "rubber and rubber chemicals." It does not refer to individual products or trade names. Believed to be the first compilation of its kind, the booklet has been prepared as an aid to research men and purchasing agents.

"Survey of American Listed Corporations. Reported Information on Selected Manufacturing Groups." A Work Projects Administration Project. Securities & Exchange Commission, Washington, D. C. 291 pages. This study presents factual data, financial and non-financial in nature, obtained from Securities & Exchange Commission records. Individual companies in nine manufacturing groups, including tires and other rubber products, are covered. The 16 rubber companies included in the study had in 1937 assets of $724,000,000 and a volume of business of $785,000,000. The information presented covers the years 1934 to 1938, inclusive, and includes: balance sheets, profit and loss statements, selected expense items, surplus reconciliations, list of parents and subsidiaries, and remuneration data.

"Metcolizing—The Best Protection for Metal Exposed to Heat." Metallizing Engineering Co., Inc., 21-07 41st Ave., Long Island City, N. Y. 8 pages. The process described in this bulletin is said to provide protection for metals against heat corrosion up to temperatures of 1832° F. The equipment used for the Metcolizing process, according to the booklet, may also be used for applying metal to worn or corroded machinery parts, for hard surfacing operations, and for applying non-corrosive coatings to metal products.

"Simplified Practice Recommendation R143-39, Paper Cones and Tubes (for Textile Winding)." National Bureau of Standards, Washington, D. C. Available from the Superintendent of Documents, Washington, 5¢. This recommendation covers stock sizes of paper cones and tubes for winding warp and knitting yarns of cotton, rayon, silk, and worsted; asbestos roving; tire cords; thread; wire insulating yarns; etc. The recommendation originally became effective in 1933; while the revision was adopted on October 15, 1939.

BIBLIOGRAPHY

THE NETHERLANDS' RUBBER INDUSTRY. H. C. J. H. Gellissen, *Rubber (Amsterdam)*, 2, 5, 4-6 (1939).

VISCOSITY AND CREAMING CAPACITY OF LATEX. J. W. van Dalfsen, *Arch. Rubbercultuur*, 23, 1-28 (1939).

NOTES ON THE METHOD OF ROBERTS FOR THE ANALYSIS OF RAW RUBBER. G. M. Kraay and R. F. A. Altman, *Arch. Rubbercultuur*, 22, 223-30 (in English, 231-38) (1938).

DETERMINATION OF THE DRY RUBBER CONTENT OF CREAM SERUM. G. E. van Gils, *Arch. Rubbercultuur*, 23, 29-31 (1939).

DETERMINATION OF NITROGEN IN RUBBER. H. P. Stevens, *Chem. and Ind.*, 841, 932 (1939); H. Nicol, *Ibid.*, 878 (1939).

ELECTRICAL PROPERTIES OF SOLIDS. IV. Influence of Thermal History on Polyvinyl Chloride Plastics. V. Their Variation at 40° with Frequency and Composition in the System Polyvinyl Chloride-Tricresyl [Tritolyl] Phosphate. R. M. Fuoss, *J. Amer. Chem. Soc.*, 61, 2329-40 (1939).

PHYSICS OF RUBBER. I. Observed Elastic and Thermoplastic Behavior. E. Guth, *J. Applied Phy.*, 10, 161-71 (1939).

RUBBER SCIENCE AND TECHNOLOGY AS REFLECTED IN TRADE PUBLICATIONS. I. Cross-Section of Contributions in *Gummi-Zeitung* and *Kautschuk*, of 1939. *Gummi-Ztg.*, Jan. 5, 1940, pp. 6-8.

EBONITE AS ACID AND ALKALI-RESISTANT MATERIAL. H. van der Meuden, *Rubber*, Dec., 1939, pp. 4-7.

RESISTANCE OF RUBBER TO DYNAMIC STRESSES. R. Ariano, *Gomma*, July-Aug., 1939, pp. 97-103.

DEICING DEVICES FOR AIRPLANES, PARTICULARLY MECHANICAL DEVICES. A. Boschi, *Gomma*, July-Aug., 1939, pp. 104-14.

SOME PROPERTIES OF PERBUNAN. I. E. Lightbown, *Rubber Age (N. Y.)*, Apr., 1940, pp. 19-21.

ORGANIC RUBBER ACCELERATORS. R. L. Sibley, *Rubber Age (N. Y.)*, Apr., 1940, pp. 22-25.

ADVANCES IN LATEX TECHNOLOGY. II. R. J. Noble, *Rubber Age (N. Y.)*, Apr., 1940, pp. 29-34. (To be continued.)

BUNA RUBBERS. A. Koch, *Ind. Eng. Chem.*, Apr., 1940, pp. 464-67.

BEHAVIOR OF POLYVINYL CHLORIDE PLASTICS UNDER STRESS. I. J. Russell, *Ind. Eng. Chem.*, Apr., 1940, pp. 509-12.

CHLOROFORM EXTRACT OF RECLAIMED RUBBER. H. F. Palmer and F. L. Kilbourne, Jr., *Ind. Eng. Chem.*, Apr., 1940, pp. 512-18.

EFFECT OF PARTICLE SHAPE OF WHITE PIGMENTS ON OPACITY. H. A. Depew and A. C. Eide, *Ind. Eng. Chem.*, Apr., 1940, pp. 537-40.

TRENDS IN THE DEVELOPMENT OF SYNTHETIC RUBBERS. Per K. Frolich, *Ind. Eng. Chem. (News Ed.)*, Apr. 10, 1940, pp. 285-86.

"WHAT IS COSTING AND ITS RELATION TO PRICE FIXING?" D. Cairns, *India Rubber J.*, Mar. 16, 1940, pp. 3-6.

HEVEA BRAZILIENSIS AND DISEASE RESISTANCE. H. Ashplant, *India Rubber J.*, Mar. 16, 1940, pp. 12-14.

LASTEX AND ELASTIC KNITTED FABRICS. *Rayon Textile Monthly*, Apr., 1940, pp 63-64.

ELASTIC YARN USES INCREASE. H. P. Galloway, *Textile World*, Apr., 1940, pp. 71-72.

V-BELT DRIVES. R. F. Vogt, *Product Eng.*, Apr., 1940, pp. 171-73.

QUESTS FOR HIGHER PRODUCTIVITY. H. Ashplant, *India Rubber J.*, Mar. 23, 1940, pp. 4-6.

NEW USES OF RUBBER IN WARTIME. H. C. Young, *Rubber Age (London)*, Mar., 1940, pp. 11-12.

THE TRADE GERMANY HAS FORFEITED IN WORLD MARKETS. *Rubber Age (London)*, Mar., 1940, pp. 13-14.

THEY PIONEERED THE HOT WATER BOTTLE. *Rubber Age (London)*, Mar., 1940, pp. 15-16.

PREVENTING ACCIDENTS IN THE FACTORY. *Rubber Age (London)*, Mar. 1940, pp. 17, 19.

FLOORING BASES AND UNDERLAYS. J. G. Robertson, *Trans. Inst. Rubber Ind.*, Dec., 1939, pp. 196-208.

MECHANISM OF POLYMERIZATION REACTIONS. H. W. Melville, *Trans. Inst. Rubber Ind.*, 209-24.

WEAVING COVERED-RUBBER YARN. C. E. Bergamini, *Textile World*, Mar., 1940, p. 58.

X-RAY DEFRACTION PATTERNS OF HEVEA, MANIHOT AND OTHER RUBBERS. G. L. Clark, S. T. Gross, and W. H. Smith, *Rubber Chem. Tech.*, Jan., 1940, pp. 42-47.

THE JOULE EFFECT. W. B. Wiegand and J. W. Snyder, *Rubber Chem. Tech.*, Jan., 1940, p. 49.

MOLECULAR WEIGHT OF SOL AND GEL IN CRUDE HEVEA RUBBER. A. R. Kemp and H. Peters, *Rubber Chem. Tech.*, Jan., 1940, pp. 11-27.

RUBBER STRETCHED BY FORCES IN TWO DIRECTIONS PERPENDICULAR TO ONE ANOTHER. R. Ariano, *Rubber Chem. Tech.*, Jan., 1940, pp. 92-102.

VISCOSITY OF PRESERVED AND CONCENTRATED LATEX. I. E. Rhodes and H. F. Smith, *J. Rubber Research Inst. Malaya*, Dec., 1939, pp. 171-88; E. Rhodes, *Ibid.*, pp. 189-99.

ETHERS AND ETHER-ESTERS OF LAC AND THEIR POLYMERIZATION. B. S. Gidvani, *Bull. London Shellac Res. Bur.*, Dec., 1939, pp. 17, 23.

THEORIES OF ACCELERATION. L. B. Sebrell, *Ind. Eng. Chem.*, Dec., 1939, pp. 1468-71.

EXAMINATION OF A SAMPLE OF SUBLIMED LITHARGE. J. R. Scott, *J. Rubber Res.*, 8, 125-29 (1939).

APPLICATION OF THE INTERFEROMETER TO MEASUREMENT OF DIMENSIONAL CHANGES IN RUBBER. L. A. Wood, N. Bekkedahl, and C. G. Peters, *J. Res. Nat. Bur. Stand.*, 23, 571-83 (1939).

TENSILE PROPERTIES OF RUBBER COMPOUNDS AT HIGH RATES OF STRETCH. F. L. Roth and W. L. Holt, *J. Res. Nat. Bur. Stand.*, 23, 603-16 (1939).

TUBE MOLD FOR MAKING SCHOPPER TENSILE TEST RINGS. E. B. Johnson, *J. Rubber Res.*, 8, 131-34 (1939).

PHYSIOLOGICAL ROLE OF RUBBER IN RUBBER PLANTS—TAU-SAGHYZ AND CRIM-SAGHYZ. F. P. Mazanko, *Rev. gén. caoutchouc*, Dec., 1939, pp. 375-77.

Patents and Trade Marks

MACHINERY

United States

2,194,253. **Fabric Coating Apparatus.** R. C. Benner, R. L. Melton, and H. P. Kirchner, assignors, by mesne assignments, to Carborundum Co., all of Niagara Falls, N. Y.

2,194,313. **Apparatus and Method for Shaping Thermoplastic Rods, Tubes, Etc.** E. G. Loomis, Newark, N. J.

2,194,757. **Machine to Finish Battery Tops.** E. O. Klaas and E. H. Meyers, both of Cleveland, O., assignors to the Klaas Machine & Mfg. Co., a corporation of O.

2,195,181. **Machine to Make Elastic Top Stockings.** H. McAdams, assignor to Nolde & Horst Co., both of Reading, Pa.

2,195,333. **Sole Cementer.** E. J. Le Gault, Haverhill, assignor, by direct and mesne assignments, to Bestco Shoe Machinery, Inc., Ipswich, both in Mass.

Dominion of Canada

386,788. **Golf Ball Winder.** E. A. Bogoslowsky, assignee of B. Bogoslawsky, both of New York, N. Y., U. S. A.

387,241. **Tire Tuber.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. C. Miller, Los Angeles, and R. C. Sourwine, Walnut Park, co-inventors, both in Calif., U. S. A.

United Kingdom

513,808. **Apparatus to Manipulate Tire Fabric Bands.** Dunlop Rubber Co., Ltd.

514,017. **Fluid Pressure Operated Control Mechanisms.** Firestone Tire & Rubber Co., Ltd.

514,373. **Apparatus and Process for Continuous Cable Impregnation.** W. J. Fraser & Co., Ltd., Callender's Cable & Construction Co., Ltd., F. Peel, and R. S. Vincent.

514,444. **Plastics Extruder.** Tyne Metal Co., Ltd., and G. Robson.

514,677. **Control Valves.** Dunlop Rubber Co., Ltd., G. E. Beharrell, J. Wright, H. Trevaskis.

514,910. **Apparatus to Assemble Gas-Mask Respirators.** F. G. Downing.

Germany

687,877. **Mold for Articles from Rubber Dust.** J. Duarry, Paris, France. Represented by C. Bientzle, Berlin-Sudende.

688,478. **Feeder Table for Feeding Parts to Tire Drum.** A. Frohlich, Hochst Odenwald, and L. Herbert, Frankfurt a.M.

688,479. **Tire Groover.** Deutsche Tecalemit-Gesellschaft m.b.H., Windelsbleiche, Kr. Bielefeld.

688,555. **Printing Roll** Consisting of Metal Core Covered with Rubber or Thermoplastic Material. Gummiwerke Elbe, A.G., Kleinwittenberg, Elbe.

PROCESS

United States

2,194,036. **Spongy Rubber-Fiber Products.** (Latex.) J. A. Talalay, Bedford, assignor of one-third to Moulded Hair Co., Ltd., and one-third to J. A. Howard, both of London, both in England.

2,194,132. **Reenforced Ball.** W. J. Voit, Los Angeles, and L. C. Weimer, Southgate, assignors, by mesne assignments, to W. J. Voit, Los Angeles, both in Calif.

2,194,206. **Dual Wheel Structure.** H. D. MacDonald, La Grange, Ill., assignor to International Harvester Co., a corporation of N. J.

2,194,341. **Reducing Rate of Gas Diffusion** through Rubber Pneumatic Means by Coating Surface with an Adhesive Polymer of Isobutylene. V. Voorhees, Hammond, Ind., assignor to Standard Oil Co., Chicago, Ill.

2,194,392. **Packing and Storing Carbon Black** with the Exclusion of Oxygen. C. G. Keeton, deceased, L. Keeton, administratrix, both of Independence, Mo., assignor to Danciger Oil & Refineries, Inc., Tulsa, Okla.

2,194,941. **Insulated Wires.** A. P. Hinsky, assignor to Pyro Products Corp., both of Brooklyn, N. Y.

2,195,126. **Multi-Loop V-Belts.** J. N. Smith, Salem, and J. M. Bierer, Waban, assignors to Boston Woven Hose & Rubber Co., Cambridge, all in Mass.

2,195,182. **Elastic Top Stocking.** H. McAdams, assignor to Nolde & Horst Co., both of Reading, Pa.

2,195,623. **Producing Sponge Rubber** by Heating Rubber, Sulphur, and an Accelerator in the Presence of a Salt of Bis (Imino, Amino Methyl) Disulphides. M. W. Harman, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,196,060. **Coating Process** Utilizing a Solution of Plasticized Rubber. O. B. Crowell and F. A. McGregor, both of Toronto, Ont., Canada, assignors to General Electric Co., a corporation of N. Y.

Dominion of Canada

387,243. **Fibrous Material Processing.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. A. Young, Westfield, N. J., U. S. A.

387,244. **Fibrous Material Processing.** (Latex.) Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. A. Young, Westfield, N. J., U .S. A.

387,245. **Fibrous Material Processing.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. A. Young, Westfield, N. J., U. S. A.

387,246. **Fibrous Material Processing.** (Latex.) Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. A Young, Westfield, N. J., U. S. A.

387,256. **Storage Battery Cell Cover.** B. F. Goodrich Co., New York, N. Y., assignee of H. J. Flikkie, Akron, O., both in U. S. A.

387,416. **Traction Tire Casing.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of E. F. Wait, Detroit, Mich., and J. E. Hale, Akron, O., both in U. S. A.

United Kingdom

496,780.* **Caoutchouc Articles.** Chemische Fabrik J. A. Benckiser Ges. & Anr.

513,348. **Shaping and Vulcanizing Belting.** A. H. Stevens, (Boston Woven Hose & Rubber Co.)

513,930. **Tire Cords.** M. Castricum, F. C. Kennedy, and United States Rubber Products, Inc.

513,939. **Rubber Compounds and Products.** J. Stein.

514,313. **Adhesives.** H. Klemm.

514,402. **Adhesive Sheets or Tapes.** Minnesota Mining & Mfg. Co.

514,598. **Rubber Compounds.** J. Stein.

514,795. **Vinyl Halides.** I. G. Farbenindustrie A. G.

514,830. **Denture Parts.** Reichsverband Deutscher Dentisten.

514,912. **Synthetic Rubber-like Materials.** J. G. Anderson, R. Hill, L. B. Morgan, and Imperial Chemical Industries, Ltd.

515,129. **Tire Treads and Other Non-slip Surfaces.** Dunlop Rubber Co., Ltd., and J. A. Wilson.

515,187. **Plastic Tubing** from Thermoplastic Material. E. I. du Pont de Nemours & Co., Inc.

515,299. **Molding Sheets** from Plastic Masses. V. Lefebure, J. B. Sandford, and Imperial Chemical Industries, Ltd.

515,334. **Gutta Percha or Balata Compositions.** Dunlop Rubber Co., Ltd., D. F. Twiss, and R. W. Hale.

Germany

687,485. **Repairing Tires.** K. Sander, Nurnberg.

688,306. **Multi-colored Rubber Sheet.** E. Frohlich, Osterode, Harz.

688,314. **Equalizing Torsion Vibration Dampers.** Continental Gummi-Werke A.G., Hannover.

688,329. **Mesh Fabric with Rubber Weft Threads.** Firma A. Robert Wieland, Auerbach, Erzgeb.

688,768. **Driving and Conveying Belts.** J. E. C. Bongrand, Paris, France. Represented by G. Breitung and H. Marsch, both of Berlin.

688,831. **Knit Goods with Rubber Warp Threads.** P. Schonfeld, Chemnitz.

CHEMICAL

United States

2,194,350. **Polymerizing an Aqueous Suspension of Chloroprene** with Other Unsaturated Organic Compounds in the Presence of Emulsion Stabilizer, Comprising a Partially Saponified Polyvinyl Acetate. (Synthetic.) H. Berg, Burghausen, assignor to Chemische Forschungsgesellschaft m.b.H., Munich, both in Germany.

2,194,416. **Polymeric 1-Furylbutadienes-1,3.** (Synthetic.) W. Bock, Cologne-Riehl, assignor to I. G. Farbenindustrie A.G., Frankfurt a.M., both in Germany.

2,194,579. **Molding Composition** Comprising Polymerized Chloroprene and Polymerized Vinyl Ester Resin. (Synthetic.) W. H. Wedger, Belmont, assignor to B. B. Chemical Co., Boston, both in Mass.

2,194,958. **Dispersing a Resilient Polymer** of a Saturated Aliphatic Hydrocarbon in an Aqueous Medium. (Synthetic.) A. Szegvari, Fairlawn, and A. H. Feikert, Wadsworth, assignors to American Anode Inc., Akron, all in O.

2,195,380. **Polysulphide Plastic.** (Synthetic.) J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., Trenton, N. J.

2,195,424. **Dusting Powder** for Rubber, Containing a Flux and an Accelerator. P. A. Raiche, North Providence, R. I.

2,195,827. **Latex Compound** Containing a Dispersion of a Blend Comprising Sulphur and Paracoumarone Resin, the Blend Prepared by Fusion of Sulphur and Resin. A. O. Ryan, Trenton, N. J., assignor to Barrett Co., New York, N. Y.

Dominion of Canada

387,304. **Hardening Diene Hydrocarbons,** Including Butadiene, by Heating In Oxygen-free Atmosphere, Containing Chloro-Benzene Vapors. (Synthetic.) Shell Development Co., San Francisco, Calif., U. S. A., assignee of H. I. Waterman and W. L. J. de Nie, co-inventors, both of Delft, The Netherlands.

387,523. **Abrasive Wheel.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. T. Rainier, Nutley, N. J., U. S. A.

United Kingdom

512,942. **Urea Derivatives** Suitable as Accelerators. Wingfoot Corp.

513,004. **Vulcanization of Rubber.** Wingfoot Corp.

513,116. **Synthetic Rubber-like Materials.** I. G. Farbenindustrie A.G.

514,560. **Rubber Hydrohalide Films.** R. P. Dinsmore.

514,785. **Rubber-like Compositions.** Craigpark Electric Cable Co., Ltd., and J. R. M. Duncan.

514,944. **Expanded Rubber.** Expanded Rubber Co., Ltd., (Rubatex Products, Inc.)

515,015. **Mercapto-Arylene-Thiazoles.** United States Rubber Products, Inc.

GENERAL

United States

21,411. (Reissue.) **Tire Bead Reenforcer.** S. A. Reed, Duxbury, assignor to Plymouth Cordage Co., Plymouth, both in Mass.

2,191,544. **Cable Splicing Sheath.** H. Ruskin, Chicago, Ill.

2,191,549. **Window Channel.** L. Sparagen, assignor to Bridgeport Coach Lace Co., Inc., both of Bridgeport, Conn.

2,191,579. **Hose Connection.** J. J. Nelson, Birmingham, Ala.

2,191,603. **Factice-Containing Printing Ink.** T. C. Whitner, Jr., Elizabeth, N. J., assignor to Ellis Laboratories, Inc., a corporation of N. J.

2,191,611. **Radiator Overflow Regulator.** J. E. Eshbaugh and N. Walker, both of Flint, assignors to General Motors Corp., Detroit, both in Mich.

2,191,626. **Belt Tightener.** A. E. Rogers, Fullerton, Calif.

2,191,636. **Radiator Overflow Valve.** N. Walker, Flint, assignor to General Motors Corp., Detroit, both in Mich.

2,191,642. **Scrubbing Device.** M. Carvalho, Somerville, Mass.

2,191,698. **Exerciser.** M. E. Painter, Brookville, O.

2,191,704. **Transfer Adhesive Product.** A. Bennett, San Francisco, Calif.

2,191,705. **Container Closure.** A. J. Chamberlain, Lafayette, La.

2,191,715. **Ice Cube Tray.** D. P. Heath, Hillsdale, Mich.

2,191,728. **Fluid Supply Hose and Reel Means.** T. E. Purcell, Mt. Lebanon, and I. E. Church, Bethel Township, both in Pa.

2,191,762. **Wheel.** H. J. Horn, assignor to Motor Wheel Corp., both of Lansing, Mich.

2,191,812. **Stopper Fastener.** H. C. Warren, Stratford, assignor to Canfield Rubber Co., Bridgeport, both in Conn.

2,191,834. **Horseshoe Pad.** D. B. Slack, Westerville, O.

2,191,861. **Pump Cylinder** T. R. Rymal, Refugio, Tex.

2,191,873. **Oil Seal for Shafts.** J. B. Vietor, Oak Park, assignor to Victor Mfg. & Gasket Co., Chicago, both in Ill.

2,191,937. **Light Shield.** C. H. Low, assignor to Flents Products Co., Inc., both of New York, N. Y.

*Amended specifications.

2,191,950. **Tractor Wheel.** M. E. R. Bernardon, assignor to Société Anonyme des Pneumatiques Dunlop, both of Paris, France.
2,191,956. **Seat Slip-on Cover.** D. D. Coldren, Schuykill Haven, Pa.
2,191,995. **Cable.** T. R. Scott and R. C. Mildner, both of London, England, assignors to International Standard Electric Corp., New York, N. Y.
2,192,002. **Venetian Blind Cord Controller.** S. R. Bond, New York, N. Y., and H. K. Lorentzen, Montclair, N. J.; Bond assignor to Lorentzen.
2,192,042. **Fluid Control Mechanism.** B. Hoffman, Spandau, Germany, assignor to General Electric Co., a corporation of N. Y.
2,192,064. **Demountable Wheel.** L. V. Pettinati, New York, N. Y.
2,192,080. **Bathing Cap.** A. L. Hock, Buffalo, N. Y.
2,192,177. **Satchel-Bottom Bag Machine.** L. Bischoff, Brooklyn, assignor to Oneida Paper Products, Inc., New York, both in N. Y.
2,192,184. **Temple Roll.** (Synthetic.) C. T. Dickey, Elizabeth, assignor to Rodic Rubber Corp., Garwood, both in N. J.
2,192,226 and 2,192,227. **Tire Anti-skid Device.** J. G. Hill, Franklin Township, Pa.
2,192,296. **Circuit Closing Device.** E. S. Boynton, East Orange, N. J.
2,192,305. **Shaft Seal.** G. P. Gilman, assignor to Rotary Seal Co., both of Chicago, Ill.
2,192,355. **Pneumatic Spring** with Spiral Bead. J. W. Kuhn, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,192,401. **Wringer Roll Release.** N. L. Etten, assignor to Chamberlain Corp., both of Waterloo, Iowa.
2,192,408. **Combination Comb and Sheath Handle.** E. J. Lux, New York, N. Y., assignor to Columbia Protektosite Co., Inc., Carlstadt, N. J.
2,192,419. **Non-skid Tire Device.** G. D. Storrs, assignor to Gillette Rubber Co., both of Eau Claire, Wis.
2,192,429. **Gas Administration Machine.** J. L. Bloomheart, assignor to M. F. McKesson, both of Toledo, O.
2,192,470. **Eraser.** F. M. Hale, Mexico, D. F., Mexico.
2,192,519. **Display Case Door.** H. D. King, Cuyahoga Falls, O., assignor to American Hard Rubber Co., New York, N. Y.
2,192,548. **Fluid Pressure Power Actuator.** R. R. Gunderson, assignor to Vacuum Power Brake Co., both of Los Angeles, Calif.
2,192,558. **Tooth and Jaw Protector.** J. B. Poindexter, Huntington, W. Va.
2,192,572. **Tire Valve.** P. M. Bourdon, Paris, assignor to Michelin et Cie., Clermont-Ferrand, both in France.
2,192,573. **Resilient Perforated Sheet.** L. A. Dunajeff, assignor to Commercial Ingredients Corp., both of New York, N. Y.
2,192,601. **Sponge Rubber Mattress.** N. D. Mattison, Montclair, N. J.
2,192,665. **Turbine Pump Bearing.** C. A. and M. H. Robben, both of Norton, Kan.
2,192,681. **Vacuum Pump** for Liquid Fuels. R. M. Gragg, Portales, N. Mex., assignor to K. D. Leftwich, Lubbock County, Tex.
2,192,708. **Laminated Sheet** Comprising a Layer of Rubber and a Transparent Non-fibrous Base. A. Hershberger, Buffalo, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,192,766. **Cane Crutch.** P. Cederstrom, New York, N. Y.
2,192,768. **Therapeutical Heating Device.** T. J. Cross, Fort Worth, Tex.
2,192,798. **Hosiery** Containing Rubber Yarn. A. E. and F. R. Page, both of Brooklyn, assignors to Scott & Williams, Inc., New York, both in N. Y.
2,192,799. **Metabolism Machine.** C. V. Perrill, Evanston, Ill.
2,192,817. **Bicycle Reflector Signal.** G. Sanger and J. L. Herron, both of Chicago, Ill., Herron assignor of one-half to Sanger.
2,192,832. **Covered Wires.** H. Ito, Yokohama-Shi, and T. Masuda, Tokyo-Shi, both in Japan.
2,192,837. **Bathing Cap.** J. W. Lusk, Auburn, N. Y.
2,192,875. **Labeling Machine.** W. H. Weeden, Milton, assignor to Pneumatic Scale Corp., Ltd., Quincy, both in Mass.
2,192,878. **Traffic Marker.** J. D. Beebe, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,192,936. **Endless Drive Belt.** S. Segal, Brooklyn, N. Y.
2,192,946. **Grommet.** H. G. Towner, New Haven, Conn.
2,192,976. **Lubricant.** A. J. Kraus, assignor to Richards Chemical Works, Inc., both of Jersey City, N. J.
2,192,979. **Hose Clamp.** M. J. McAneny, Jr., Denver, Colo.
2,192,980. **Conductor** Insulated with Purified Latex, Having Water Soluble Constituents Insolubilized. J. McGavack, Leonia, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,193,017. **Aerial Conductor.** R. E. Bassett, Jr., South Bend, Ind.
2,193,036. **Nozzle Extension.** W. F. McGraw, Detroit, Mich.
2,193,042. **Rotating Tool Center.** W. Roterberg, Dusseldorf, Germany.
2,193,053. **Stay Tape.** H. Atwater, Worcester, Mass.
2,193,056. **Elastic Zipper Anklet.** J. L. Burn, Niota, Tenn.
2,193,069. **Balloon.** E. E. Krueger, assignor to Lee-Tex Rubber Products Corp., both of Chicago, Ill.
2,193,081. **Laminated Rubber Tension Spring** for Motor Vehicle Suspension. J. F. Soper, Balclutha, New Zealand.
2,193,097. **Lamp Lens Tool.** O. G. Hildebrand, Cleveland, O.
2,193,131. **Demountable Rim.** E. C. Hansen, Auburn, Ala.
2,193,156. **Articulated Vehicle Construction.** V. F. Antoine, Anaconda, Mont.
2,193,169. **Tire Display Stand.** E. E. George, assignor to Dura-Products Mfg. Co., both of Canton, O.
2,193,171. **Foundation Garment.** M. Gross, New York, N. Y.
2,193,247. **Wringer Rolls** with Belt Feed. J. B. Dyer, assignor to General Motors Corp., both of Dayton, O.
2,193,266. **Target Trap.** G. H. Betts, Altadena, Calif.
2,193,332. **Engine Mount.** J. S. Hasbrouck, Manchester, assignor to United Aircraft Corp., East Hartford, both in Conn.
2,193,356. **Bowl Protector.** E. S. Green, San Francisco, Calif.
2,193,404. **Fishing Line Bob.** W. S. Goertzen, Newton, Kan.
2,193,405. **Plate-Type Heat Exchanger.** H. F. Goodman, assignor to Aluminum Plant & Vessel Co., Ltd., both of London, England.
2,193,419. **Mattress** Comprising Inner Spring, Cellular Rubber Pad, and Cellulosic Padding. W. G. Schubert, Cincinnati, assignor to Stearns & Foster Co., Lockland, both in O.
2,193,420. **Venting Closure for Jars.** H. Ingram, Wheeling, W. Va.
2,193,444 **Girdle.** L. F. Campbell, assignor to Treo Co., both of New York, N. Y.
2,193,467. **Garment Crotch.** G. E. Rutledge, assignor to Vassar Co., both of Chicago, Ill.
2,193,481. **Clutch.** T. L. Fawick, Akron, O., assignor to Fawick Co., Inc., Wabash, Ind.
2,193,517. **Closing Means** for Tubes and Bottles. B. Lindstrom, Stockholm, Sweden.
2,193,551. **Sliding Back** for Corsets. F. A. Cohen, New York, N. Y.
2,193,564. **Band-Type Stamp.** H. J. Melind, assignor to J. W. Melind, both of Chicago, Ill.
2,193,571. **Floor Scraper.** H. Siemund, assignor to Greenview Mfg. Co., both of Chicago, Ill.
2,193,645. **Feather Ball.** C. S. Raizen, New Rochelle, N. Y., and W. D. May, Franktown, Nev.
2,193,689. **Guardrail Bracket.** G. A. Gleason and A. P. Hayden, both of Worcester, Mass., assignors to American Steel & Wire Co. of N. J., a corporation of N. J.
2,193,719. **Rubber Scuff Plate.** T. W. Foote, Cleveland, O.
2,193,757. **Slide Fastener.** G. M. Beckwith, Meadville, Pa., assignor to Talon, Inc., a corporation of Pa.
2,193,781. **Storage Battery.** E. W. Smith, assignor to Electric Storage Battery Co., both of Philadelphia, Pa.
2,193,805 **Bottle Pouring Sleeve and Cap.** R. E. Deschner, Los Angeles, Calif.
2,193,841 **Tire Pressure Indicator.** H. G. Renger, Detroit, Mich.
2,193,878. **Cutter Mounting.** W. L. Martin, Cleveland, O., assignor, by mesne assignments, to International Register Co., Chicago, Ill.
2,193,899. **Deformed Transfer Members.** L. V. Casto, Detroit, Mich., and G. von Webern and E. W. Hamant, both of Dayton, O., assignors to Oxford Varnish Corp., Detroit, Mich.
2,193,945. **Apparatus to Measure and Supervise Heart Action.** S. Strauss and L. Weisglass, Vienna, Germany.
2,193,960. **Wheel.** F. W. Burger, Niles, assignor to Clark Equipment Co., Buchanan, both in Mich.
2,193,978. **Massager.** L. H. Miller, assignor to G. S. Miller, both of Bloomfield, N. J.
2,193,990. **Door Check.** P. H. Travis, Detroit, Mich.
2,194,003. **Article Holder for Loose-Leaf Notebooks.** D. K. Brooks, Abilene, Kan.
2,194,004. **Preserving Jar Cap and Indicator.** R. B. Bukolt, Stevens Point, Wis.
2,194,024. **Bottle Carrier.** H. Kühn, Munich, Germany.
2,194,043. **Adjustable Closure Means** for Headwear. H. K. Jacobi, New York, N. Y.
2,194,053. **Hydraulic Shock Absorber.** R. F. Peo and G. M. Magrum, assignors to Houde Engineering Corp., all of Buffalo, N. Y.
2,194,062. **Valve Seat Grinder.** F. O. Albertson and H. E. Dowling, assignors to Albertson & Co., Inc., all of Sioux City, Iowa.
2,194,067. **Pocket Case.** J. Campbell, New York, N. Y.
2,194,070. **Sound Translating Device.** G. M. Giannini, Plandome, N. Y., assignor, by mesne assignments, to Associated Electric Laboratories, Inc., Chicago, Ill.
2,194,109. **Window Channel.** H. J. Bader, assignor to Troy Sunshade Co., both of Troy, O.
2,194,116. **Artificial Leg Connection.** G. E. Forster, Cincinnati, O.
2,194,122. **Brushes.** J. Krams, Frankfurt a.M., Germany, assignor to E. Frohmann, New York, N. Y.
2,194,129. **Tire Inflater.** B. E. Shaw, Bristol, assignor to Penn Electric Switch Co., Goshen, both in Ind.
2,194,147. **Container Closures.** A. Mauser, Marienburg, Cologne, Germany, assignor, by mesne assignments, to N. V. Serlox, The Hague, Netherlands.
2,194,150. **Self-Wringing Rubber Mop.** F. S. Price, Los Angeles, Calif.
2,194,156. **Shoulder and Sleeve Construction.** H. A. Speh, deceased, H. C. Speh, executor, assignor to Drybak Corp., all of Binghamton, N. Y.
2,194,181. **Undergarment.** H. L. Jasper, assignor to La Resista Corset Co., both of Bridgeport, Conn.
2,194,191. **Garment Display Rack.** M. A. Wolf, Dallas, Tex.
2,194,233. **Vacuum Bottle Stopper.** J. Renka, Jr., New York, N. Y.
2,194,255, 2,194,256, 2,194,257, 2,194,258, 2,194,259, 2,194,260, and 2,194,261. **Valves and Valve Packings.** H. Allen, Houston, Tex., assignor to Cameron Iron Works, a corporation of Tex.
2,194,262. **Valve.** H. Allen and M. T. Works, both of Houston, Tex., assignors to Cameron Iron Works, a corporation of Tex.
2,194,331. **Wire Line Bridge Plug.** C. E. Strom, South Gate, Calif.
2,194,364. **Sponge Rubber Product.** H. R. Minor, assignor to Industrial Process Corp., both of Dayton, O.
2,194,417. **Display Rack.** W. R. Bowes, assignor to Clayton Mfg. Co., both of Bristol, Conn.
2,194,437. **Tire Chain Swivel Device.** F. E. Stahl, deceased, L. M. Stahl, administratrix, assignor to Columbus McKinnon Chain Corp., all of Tonawanda, N. Y.
2,194,451. **Sheet Rubber Package** for Coffee. L. D. Soubier, Toledo, O., assignor to Owens-Illinois Glass Co., a corporation of O.
2,194,484. **Combination Comb and Brush.** M. Segal, Brooklyn, N. Y.
2,194,569. **Mattress and Upholstering Pad.** I. J. Rumpf, Burlingame, assignor of one-half to H. Rumpf, San Francisco, both in Calif.
2,194,635. **Valve Stem.** A. E. Bronson, Shaker Heights, assignor to Dill Mfg. Co., Cleveland, both in O.
2,194,649. **Perfumed Sponge Rubber Article.** A. C. Fischer, Chicago, Ill.
2,194,653. **Mat.** G. F. Gell, East Cleveland, assignor, by direct and mesne assignments, to Maier Products Co., Inc., Cleveland Heights, both in O.
2,194,671. **Heated Windshield Wiper.** C. Pauro, Camden, N. J.
2,194,674. **Football.** J. T. Riddell, Chicago, Ill.
2,194,721. **Gyrating Screening Apparatus.** W. F. Piper, Oak Park, assignor to Beardsley & Piper Co., Chicago, both in Ill.
2,194,734. **Belt.** P. Brenner, Youngstown, O.
2,194,735. **Tire Pressure Signal.** R. Bridgford, B. A. Tibbits, G. H. Stevens, and C. Diehm, all of Rochester, Mich.
2,194,736. **Animal Exerciser and Amusement Device.** C. de Bruler, Washington, D. C.
2,194,758. **Mirror.** W. La Hodny and P. Bertell, assignors to Standard Mirror Co., Inc., all of Buffalo, N. Y.
2,194,791. **Undergarment.** J. A. Goldfarb, Frankfort, Ky., assignor to Union Underwear Co., Inc., Indianapolis, Ind.
2,194,792. **Shock Absorber.** H. A. Herndon, Washington, D. C.
2,194,809. **Diaphragmeter.** D. W. Powell, Jr., Baltimore, Md.
2,194,832. **Vehicle Stabilizer.** B. D. McIntyre, assignor to Monroe Auto Equipment Co., both of Monroe, Mich.
2,194,833. **Endless V-Belt** with Vari-tensioned Cords. E. Nassimbene, assignor to Gates Rubber Co., both of Denver, Colo.
2,194,850. **Tire Valve.** W. F. Goff, Akron, assignor to Ohio Injector Co., Wadsworth, both in O.
2,194,853. **Braking Mechanism.** J. W. Hatch and W. J. Burman, both of Detroit, Mich., assignors, by direct and mesne assignments, to Firestone Tire & Rubber Co., Akron, O.
2,194,860. **Elastic Fabric.** H. C. Martin, Middlesboro, Ky.
2,194,861. **Glove with Elastic Wrist.** H. C. Martin, Middlesboro, Ky.
2,194,885. **Battery Protector.** R. M. Critchfield and A. G. Phelps, both of Anderson, Ind., assignors to General Motors Corp., Detroit, Mich.
2,194,895. **Valve Stem.** H. Z. Gora, assignor to Jenkins Bros., both of Bridgeport, Conn.
2,194,903. **Football Helmet.** H. Holstein, Huntington, W. Va.
2,194,921. **Horse Boot.** N. H. Wagner, Jr., Media, Pa.
2,194,940. **Drain Stopper.** A. J. Hiertz, assignor to Bridgeport Brass Co., Bridgeport, Conn.

2,194,942, 2,194,943, and 2,194,944. **Machinery Packings.** C. R. Hubbard, assignor to Garlock Packing Co., both of Palmyra, N. Y.
2,194,989. **Obstetrical Device.** R. Torpin, Augusta, Ga.
2,194,997. **Soap Holder.** C. H. Butler, Chicago, Ill.
2,195,021. **Washing Machine Wringer Release.** E. R. H. Britton and P. R. Thillard, both of Locust Valley, N. Y.
2,195,024. **Knee Brace.** D. M. Bullock, Urbana, Ill., assignor to Rawlings Mfg. Co., St. Louis, Mo.
2,195,046. **Flexible, Resilient Beaded Strip.** F. A. Best, Windsor, Ont., Canada.
2,195,125. **Multi-Loop V-Belt.** J. N. Smith, Salem, and J. M. Bierer, Waban, assignors to Boston Woven Hose & Rubber Co., Cambridge, all in Mass.
2,195,155. **Tire Pressure Indicator Switch.** O. C. Spurlock, Burrton, Kan.
2,195,156. **Cellular Rubber Elimination Bed Pad.** E. C. Steward, Oakland, Calif.
2,195,180. **Electron Discharge Tube Holder.** M. Marzetti, assignor to Fabrica Italiana Magneti Marelli Soc. An., both of Milan, Italy.
2,195,189. **Auto Lamp Socket.** H. J. Sauer, assignor to Kilborn-Sauer Co., both of Fairfield, Conn.
2,195,199. **Circuit Breaker.** H. E. Becker, Akron, O., assignor to Amalgamated Engineering & Research Corp., Chicago, Ill.
2,195,233. **Electrical Coil** Utilizing Sheet Polyvinyl Resin Insulation. R. V. Boyer, Nahant, Mass., assignor to General Electric Co., a corporation of N. Y.
2,195,281. **Nasal Applicator.** A. A. Neuwirth, Floral Park, N. Y.
2,195,320. **Shoe** with Elastic Throat. B. Oliva, St. Albans, N. Y.
2,195,343. **Electrical Connector.** G. B. Sayre, Brooklyn, N. Y., assignor to Bendix Aviation Corp., South Bend, Ind.

Dominion of Canada

386,857. **Suction Cleaner.** Hoover Co., North Canton, assignee of E. L. Snyder, Canton, both in O., U. S. A.
386,858. **Suction Cleaner.** Hoover Co., North Canton, O., assignee of C. H. Taylor, Springfield, Mass., both in the U. S. A.
386,872. **Wall Siding.** Patent & Licensing Corp., assignee of L. Kirschbraun, both of New York, N. Y., U. S. A.
386,878. **Hose Coupling.** Scoville Mfg. Co., Waterbury, Conn., assignee of S. T. Williams, Bellerose, N. Y., both in the U. S. A.
386,879. **Strainer.** Silex Co., Hartford, assignee of W. R. Becher, Wethersfield, both in Conn., U. S. A.
386,892. **Journal Bearing Assembly** for Rail Truck. Transit Research Corp., assignee of E. H. Piron, both of New York, N. Y., U. S. A.
386,908. **Weatherstrip.** W. R. Matheny, Chicago, Ill., U. S. A., administrator of the estate of D. H. Harnly, deceased, of Chicago.
386,915. **Rubber Heel.** J. and S. Pinaud, coinventors, both of Atlantic Highlands, N. J., U. S. A.
386,917. **Inner Tube.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of R. F. Wilson and W. L. Klingman, coinventors, both of Akron, O., U. S. A.
386,926. **Calf Muzzle.** F. Marko, Westakenau, Alta.
386,941. **Hair Curler.** N. L. Solomon, New York, N. Y., U. S. A.
386,946. **Suction Nozzle.** Akt. Elektrolux, assignee of A. A. Forsberg, both of Stockholm, Sweden.
386,953. **Motor Support.** Apex Electrical Mfg. Co., Cleveland, assignee of J. J. McCabe, Euclid, both in O., U. S. A.
386,976. **Mud Tire.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of J. E. Hale, Akron, and A. Hargraves, Silver Lake, co-inventors, both in O., U. S. A.
387,000. **Motor Vehicle Wheel.** Rubery Owen & Co., Ltd., assignee of P. J. Freeman, both of Darlaston, South Staffordshire, England.
387,003. **Coffee Filter.** Silex Co., assignee of Merrow Machine Co., both of Hartford, assignee of L. H. Talmadge, Wethersfield, both in Conn., U. S. A.
387,053. **Cushion Sole Shoe.** H. G. Lumbard, Auburn, Me., U. S. A.
387,094. **Photographic Printing Machine.** Canadian Kodak Co., Ltd., Toronto, Ont., assignee of H. O. Drotning, Rochester, N. Y., U. S. A.
387,116. **Tracing Film** from Vinyl Resin. Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of R. F. Scott, St. Albans, W. Va., U. S. A.
387,123. **Fluid Control Apparatus.** Dominion Oxygen Co., Ltd., Toronto, Ont., assignee of W. J. Jacobsson, Scotch Plains, and S. R. Oldham, Elizabeth, co-inventors, both in N. J., U. S. A.
387,134. **Elastic Hosiery Top.** Interwoven Stocking Co., New Brunswick, assignee of J. W. Mettler, East Milstone, both in N. J., U. S. A.
387,151. **Undergarment.** Robert Reis & Co., New York, N. Y., assignee of J. A. Boysen, Rutherford, N. J., both in the U. S. A.
387,152. **Hair Dressing Device.** Rollocurl Corp., New York, assignee of H. C. Schlicker, Brooklyn, both in N. Y., U. S. A.
387,177. **Badminton Racket.** A. G. Spalding & Bros. of Canada, Ltd., Brantford, Ont., assignee of J. B. Dickson, Northampton, Mass., U. S. A.
387,186. **Friction Clutch and Brake.** G. Carwardine, Bath, Somerset, England.
387,187. **Traction Wheel.** P. Chaffin, Fayette County, O., U. S. A.
387,212. **Sealing Device** for Rotational Members. C. H. Warman, Kalgoorlie, Australia.
387,213. **Centrifugal Pump.** C. H. Warman, Kalgoorlie, Australia.
387,218. **Roofing and Siding Element.** Bakelite Building Products Co., Inc., New York, assignee of N. P. Harshberger, Scarsdale, both in N. Y., U. S. A.
387,242. **Elastic Yarn.** Dominion Rubber Co., Ltd., assignee of A. Coté, both of Montreal, P. Q.
387,326. **Rubber and Rubber Hydrochloride Laminated Gasket.** Wingfoot Corp., Wilmington, Del., assignee of J. A. Merrill, Akron, O., both in U. S. A.
387,372. **Water Ski and Boat.** K. Sato, Tokyo-Fu, Japan.
387,407. **Liquid Dispenser.** De Laval Separator Co., New York, N. Y., U. S. A., assignee of Non-Drip Measure Co., Ltd., assignee of F. W. and A. G. Berwick, co-inventors, all of London, England.
387,418. **Hose Supporter.** H. W. Gossard Co., assignee of H. Wipperman, both of Chicago, Ill., U. S. A.
387,419. **Foundation Garment.** H. W. Gossard Co., assignee of H. Wipperman, both of Chicago, Ill., U. S. A.
387,423. **Exhaust Pipe and Muffler Support.** Harris Products Co., Akron, O., assignee of D. T. Bradley, Detroit, Mich., both in U. S. A.
387,434. **Piston Packing.** Johns-Manville Corp., New York, N. Y., assignee of G. Christenson, Plainfield, N. J., both in U. S. A.
387,484. **Anti-Skid Device.** J. J. Larkin, Richmond, P. Q.
387,492. **Foundation Garment.** P. H. Robbins, New York, N. Y., U. S. A.
387,495 **Typewriter Platen Roll.** J. Q. Sherman, Dayton, O., U. S. A.
387,495. **Typewriter Platen Roll.** J. Q. Sherman, Q. Sherman, Dayton, O., U. S. A.
387,504. **Rail Car Truck Suspension.** E. G. Budd Mfg. Co., assignee of J. Ledwinka, both of Philadelphia, Pa., U. S. A.
387,508. **Cable.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of H. G. Knoderer, Fairfield, Conn., U. S. A.
387,519. **Sealing Means** for Shaft Openings. Cherry-Burrell Corp., Chicago, Ill., assignee of C. B. Dalzell and R. K. Miner, co-inventors, both of Little Falls, N. Y., both in U. S. A.
387,534. **Vibrating Screen.** Industrial Patents Corp., Chicago, Ill., assignee of D. R. Royer, Bartow, Fla., both in U. S. A.
387,577. **Typewriter Platen Roll.** J. Q. Sherman, co-inventor with and assignee of A. W. Metzner, both of Dayton, O., U. S. A.
387,578. **Recording Machine Feeding Means.** J. Q. Sherman, co-inventor with and assignee of W. Metzner, both of Dayton, O., U. S. A.

United Kingdom

509,667. **Dentures or Parts.** D. Hessels.
509,690. **Wringers.** Lovell Mfg. Co.
509,722. **Cables.** Felten & Guilleaume Carlswerk A.G.
509,760. **Wires and Cables.** British Insulated Cables, Ltd., B. Welbourn, F. J. Brislee, and E. A. Bayles.
509,771. **Resilient Wheel.** L. Bastier.
509,772. **Machine Gun Cartridge Belt Guide.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., F. J. Tarris, and D. Webb.
509,781. **Brakes.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., F. J. Tarris, and A. G. Brown.
510,002. **Cables.** Allgemeine Elektricitats-Ges.
510,008. **Cables.** British Insulated Cables, Ltd., B. Welbourn, F. J. Brislee, L. Macfarlane, and J. Lyon.
510,044. **Mudguards.** Dunlop Rubber Co., Ltd., and S. Sadler.
510,066. **Windshield Wipers.** Zeiss Ikon A.G.
510,069. **Barrel-Type Containers.** Firestone Tire & Rubber Co., Ltd.
510,071. **Foundation Garments.** Berger Bros. Co.
510,075. **Mounting.** United States Rubber Co.
510,093. **Windshield Wipers.** I. J. Hyam.
510,107. **Tire Repair Patch.** Bowes Seal Fast Corp.
510,150. **Filtration of Liquids.** United States Rubber Co.
510,152. **Dentures.** K. Hintenberger.
510,190. **Cables.** Felten & Guilleaume Carlswerk A.G.
510,215. **Printers' Blankets.** R. Wheatley and Victoria Rubber Co., Ltd.
510,238. **Batteries.** R. Bosch Ges.
510,283. **Drive Belts.** R. W. Cutler.
510,445. **Non-skid Tires.** P. S. Smyth.
510,455. **Vehicle Wheel Mountings.** Steyr-Daimler-Puch A.G.
510,484. **Syringes.** S. F. Cole.
510,547. **Wheel.** C. S. Vilvanathan.
510,600. **Combined Comb and Hairbrush.** G. S. Stubbs.
510,607. **Fountain Pens.** J. S. Jowitt.
510,663. **Paving Blocks.** Caoutchouc Reno.
510,801. **Insulation Resistance Measurer.** Standard Telephones & Cables, Ltd., H. S. Lehman, and E. W. Jordan.
510,811. **Telephone Cable.** Felten & Guilleaume Carlswerk A.G.
510,932. **Rubberized Belts.** Etablissements Flinois, Colmant & Cuvelier, and Colmant & Cuvelier Successeurs.
511,024. **Combs.** American Hard Rubber Co.
511,056. **Tire Wall Protector.** W. H. Lambert.
511,071. **Removable Rims.** G. Gianetti. (trading as Giulio Gianetti Di Giuseppe E Gaetano Gianetti).
511,153. **Air-Craft Brake Control.** Dunlop Rubber Co., Ltd., G. E. Beharrell, J. Wright, and H. Trevaskis.
511,261. **Toys and Whistles Therefor.** Semperit Osterreichisch-Amerikanische Gummiwerk A.G.
511,271. **Tire Treads.** United States Rubber Co.
511,314. **Harvester Binder Aprons.** North British Rubber Co., Ltd., and A. Johnston.
511,457. **Trusses.** Beasley's, Ltd., and G. H. Wales.
511,497. **Molds for Synthetic Resin.** R. T. Stock.
511,552. **Hose Coupling.** Dunlop Rubber Co., Ltd., G. E. Beharrell, J. Wright, and H. Trevaskis.
511,680. **Cables.** M. G. Rees.
511,760. **Passage Ways between Railway Coaches.** Soc. Italiana Pirelli.
511,817. **Air Pumps for Inflating Tires.** C. M. Huie.
511,839. **Cables.** W. Ohnesorge, G. Flanze, and F. Gladenbeck.
512,138. **Windshield Wipers.** Trico-Folberth, Ltd. (Trico Products Corp.)
512,161. **Trusses.** R. A. Savile.
512,271. **Rubber-tired Castor Wheels.** G. H. Hughes, Ltd., and A. L. Crawshaw.
512,378. **Non-Skid Treads.** W. Vorwerk.
512,422. **Elastic Ropes or Cords.** Dunlop Rubber Co., Ltd., and H. F. L. Jenkins.
512,475. **Cables and Hose Pipes.** Liverpool Electric Cable Co., Ltd., and J. T. Frost.
512,535. **Tires.** Firestone Tire & Rubber Co., Ltd.
512,602. **Fountain Pens.** W. W. Triggs. (Montblanc-Simplo Ges.)
512,670 and 512,671. **Cables.** Siemens & Halske A.G.
512,746. **Control Garments.** Berger Bros. Co.
512,816. **Atomizers.** C. C. S. Le Clair and Tecalemit, Ltd.
512,837. **Anti-Skid Tire Chains.** L. M. Jackson (American Chain & Cable Co.)
512,997. **Bogies for Vehicles.** G. Spencer Moulton & Co., Ltd., and R. T. Glascodine.
513,061. **Cushion Joints or Mountings.** W. W. Triggs. (H. C. Lord).
513,261. **Pneumatic Tires.** Expanded Rubber Co., Ltd., and G. C. Goodhart.

Germany

687,548. **Packing Material.** H. Reinz, Berlin-Charlottenburg.
687,800. **Buffer for Winnowing Sieve.** Carlshutte Maschinen-und Stahlbau-G.m.b.H., Waldenburg-Altwasser.
688,096. **Resilient Suspension Device** for Measuring-Instruments. Continental Gummi-Werke A.G., Hannover.
688,421. **Suspension for Motor Vehicles.** Continental Gummi-Werke A.G., Hannover.
688,430. **Latex Impregnated Gauze for Bandages.** J. A. Hinkamp and H. R. Brasel, both of Chicago, Ill., U. S. A. Represented by K. Hegel and K. Schwarzhans, both of Berlin.
688,808. **Knitted Goods with Rubber Warp.** P. Schonfeld, Chemnitz.

TRADE MARKS

United States

375,938. **Sky-tex.** Rubberized or latex-coated padding. Allen Industries, Inc., Detroit.
375,998. **Life-Saver.** Tires. B. F. Goodrich Co., New York, N. Y.
375,999. **Cornell Clipper.** Tires, casings, and tubes. The Pep Boys—Manny, Moe & Jack, Philadelphia, Pa.
376,012. **Indiair.** Tubes and tires. G. K. Feinberg, doing business as India Tire Co., Brookline, Mass.
376,031. **Kaysam.** Bulbs for sprayers, atomizers, etc. Kaysam Corp. of America, Passaic, N. J.
376,033. **Lady Ebonite The Ball That Rolls Rite.** Bowling balls. Stowe-Woodward, Inc., Newton, Mass.
376,045. **Marvelflex.** Men's wear, girdles, and underwear. Lawson Products, Inc., Pawtucket, R. I.
376,067. **Knit-Lastic.** Braces. Hickok Mfg. Co., Inc., Rochester, N. Y.
376,074. **Goal-Hi.** Game ball standards and inflatable balls. Fred Medart Mfg. Co., St. Louis, Mo.

FINANCIAL

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

American Wringer Co., Inc., Woonsocket, R. I., and subsidiaries. For 1939: net profit, $299,481 after amortization and minority interest, equal to $2.68 each on 111,284 shares of $10 par value common stock, against $21,248, or 19¢ a share in 1938; current assets, $1,028,050, current liabilities, $552,811, against $822,575 and $566,350, respectively, at the end of 1938.

Anaconda Wire & Cable Co., New York, N. Y. For 1939: net income, $648,899, equal to $1.53 each on 421,981 shares of common capital stock, against loss of $97,781 in 1938; current assets, $11,132,047, current liabilities, $2,357,828, compared with $10,364,790 and $2,619,233, respectively, on December 31, 1938.

Armstrong Cork Co., Lancaster, Pa. For 1939: net income, $4,485,000.37, equal to $3.03 a common share, against $1,150,795.74, or 77¢ a share, in 1938; domestic sales, $50,713,436, against $37,297,363; current assets, $24,824,706; current liabilities, $3,978,746.

Barber Asphalt Corp., Barber, N. J., and subsidiaries. For 1939: net profit, $544,581, equal to $1.39 each on 413,333 capital shares, including 53,677 shares held for exchange of certificates representing stock of General Asphalt Co. and Barber Co., Inc., not present for exchange, contrasted with loss of $332,822 in 1938; dollar volume of business transacted, $12,881,752, against $13,702,054; current assets, $7,144,953, including $3,840,599 cash; and current liabilities, $719,678.

Belden Mfg. Co., Chicago, Ill. For 1939: net income, $304,453, equal to $1.26 each on 241,547 capital shares, against $101,711 deficit in 1938.

Brunswick-Balke-Collender Co., Chicago, Ill., and subsidiaries. For 1939: net profit, $2,037,435, after repossession losses, foreign exchange adjustments, interest, and other charges, equal after dividend requirements on $5 cumulative preferred stock, to $4.23 each on 444,455 common shares, against $1,003,710, or $1.90 each on 441,355 common shares in 1938; net sales, $13,745,522, against $10,797,278.

Canada Wire & Cable Co., Ltd., Leaside, Ont., and subsidiaries. For 1939: net profit, $690,805, equal after dividend requirements on 28,741 shares of 6½% cumulative preferred stock and on 29,669 shares of $4 cumulative preferred A stock, to $2.56 each on 150,662 shares of Class B common stock, contrasted with net profit, $462,655, or $1.04 each on 150,662 shares of Class B common stock, in 1938.

Collyer Insulated Wire Co., Pawtucket, R. I. For 1939: net income, $33,579, equal to 22¢ each on 150,000 capital shares, against $62,473 net loss in 1938.

Detroit Gasket & Mfg. Co., Detroit, Mich. For 1939: net profit, $448,512, equal, after dividends on 6% $20-par preferred stock, to $1.82 each on 214,250 shares of $1-par common stock, against $122,710, or 29¢ a common share, in 1938.

Dewey & Almy Chemical Co., Cambridge, Mass. For 1939: consolidated net profit, $624,539, equal, after allowance for dividends of $110,270 on the $5 convertible preferred stock, to $2.66 on each of 193,535 shares of combined common and Class B common stock outstanding, against $270,063, or 82¢ a share, in 1938; current assets, $1,846,893; current liabilities, $636,928.

Dow Chemical Co., Midland, Mich., and subsidiaries. Nine months ended February 29: consolidated net profits, $5,495,945, after interest, depreciation, federal income taxes and other charges, against net profit of $2,440,560 in the corresponding period last year; profit, after dividend requirements on the 5% preferred stock, equivalent to $5.11 each on 1,031,988 shares of no-par common stock, against $2.30 each on 964,330 average common shares outstanding in the nine months ended February 28, 1939.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. First quarter, 1940: net sales and other operating revenue, $78,503,803, against $66,641,738 in the similar 1939 period; income from operations after costs, expenses and depreciation reserves, $19,781,557, against $13,804,717; total income, $27,945,376, against $21,783,564, including $7,500,000 from the investment in General Motors Corp. in each period; net income after all charges, $23,727,188 after charges and federal taxes, against $19,075,376; balance available for common stock, $22,528,801, or $2.04 a share, against $17,109,459, or $1.55 a share, in the first quarter of 1939.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont. For 1939: net profit including income from investments, $223,992, equal, after preferred dividends, to $3.22 each on 56,768 common shares, against $90,937, or 88¢ a common, in 1938; current assets, $2,776,443; current liabilities, $369,489; net working capital, $2,406,954, against $2,014,676.

Everlastik, Inc., Chelsea, Mass. For 1939: net loss, $185,695, against net loss of $105,650 in 1938.

Flintkote Co., New York, N. Y., and subsidiaries. Fifty-two weeks ended March 23: net income, after all charges including taxes, $1,444,207, equal to $2.13 each on 678,546 shares of stock outstanding, against $910,915, or $1.35 a share on 672,996 shares in the corresponding weeks a year ago; net sales, $17,444,915, against $15,164,642.

Garlock Packing Co., Palmyra, N. Y. For 1939: net profit, $1,049,476, equal to $4.80 a share on the outstanding stock.

General Cable Corp., New York, N. Y. For 1939: net income, $733,166, after all charges and taxes, against net loss of $893,714 in 1938; sales, $3,860,587, against $2,368,941.

B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont. For 1939: net loss, $8,984, against $237,318 in 1938; current assets, $2,379,276; current liabilities, $944,378; working capital, $1,434,898.

Intercontinental Rubber Co., New York, N. Y., and subsidiaries. For 1939: net income, $141,676.53, against net loss of $62,810.54 in 1938; current assets, $1,136,113.42, against $921,349.15; current liabilities, $171,181.40, against $96,660.71.

Jenkins Brothers, Bridgeport, Conn. For 1939: net income, $246,603, equal, after 7% preferred dividends, to $1.61 each on 126,612 common shares, against $127,799, or 67¢ a share, in 1938.

Link Belt Co., Chicago, Ill., and subsidiaries. For 1939: consolidated net profit, $1,733,059, equal to $2.23 a common share after dividends on the 6½% cumulative preferred stock, against $1,106,041, or $1.33 a common share in 1938.

Raybestos-Manhattan, Inc., Passaic, N. J. For 1939: net income, $1,605,296.49, equal, after providing $711,679.73 for depreciation and $426,192.64 for federal and state income taxes, to $2.54 a share; total assets December 31, 1939, $18,554,390.95, including $10,293,506.94 of current assets, equal to nearly six times the current liabilities. The company has no banking, funded debt, or other capital obligation outstanding.

U. S. Rubber Reclaiming Co., Inc., New York, N. Y. For 1939: net profit, $405,192, equal after annual dividend requirements on 76,425 shares of $25-par 8% cumulative prior preference stock and 35,877 shares of Class A preferred stock, on which are dividend accumulations, to $2.29 each on 86,720 no-par common shares, against net profit of $189,485, or $1.02 a share, on Class A stock, in 1938.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. For 1939: net profit, $257,687, after interest and foreign exchange losses, equal to 87¢ each on 295,050 shares of capital stock outstanding, against net loss of $209,230, in 1938.

Market Reviews

CRUDE RUBBER

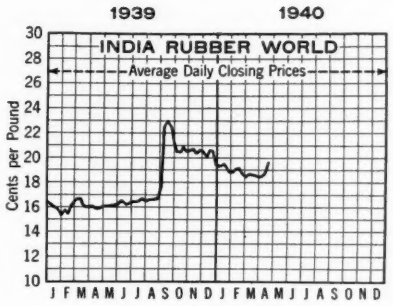
Commodity Exchange

TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

Futures	Feb. 24	Mar. 30	Apr. 6	Apr. 13	Apr. 20
Mar.	18.21	.....	.....	.....	.....
Apr.	.....	18.25	18.50	18.75	19.68
May	.....	18.10	18.42	18.65	19.58
July	17.78	17.72	17.80	18.07	19.08
Sept.	17.65	17.59	17.67	17.85	18.72
Dec.	17.50	17.42	17.45	17.66	18.50
Feb.	.....	17.38	17.41	17.56	18.38
Mar.	.....	.....	17.39	17.54	18.32
Volume per week (tons)	7,630	7,610	8,950	9,800	16,400

RUBBER prices, particularly quotations in the spot and nearby months, scored sharp advances during April in a nervous market. After closing at 17.89¢ per pound on March 28, July futures receded to close at 17.71¢ per pound on April 4, and then began a series of sharp advances that carried the price to 19.08¢ on April 20. On April 22 the market slumped with July futures dropping to close at 18.68¢ per pound. Thereafter the market was stronger, and the closing price on April 27 was 18.85¢ per pound. The maximum spread between spot and distant months increased sharply from 47 points on March 26 to a high of 158 points on April 18.

Influencing factors in the market's sharp advance were: increasing nervousness on the part of importers over the spread of the European war to Scandinavia and the possible involvement of Holland which might result in added shipping costs, increased insurance rates, and disruptions in shipping schedules; and rumors that the next meeting of the International Rubber Regulation Committee, scheduled for May 21, may bring about a reduction in the export quota from producing countries. Another factor was the notice that the Straits Settlements and Federated Malay States started to levy a 2½% ad valorem export tax on rubber and tin, effective April 1. The Department of Commerce was informed that the tax is not applicable to companies registered in the United Kingdom and that the imposts are estimated to apply to 62% of rubber exports. The Commodity Exchange, Inc., was advised that the tax was on a sliding scale and that rubber valued under 20¢ would be taxed 1%. The tax increases to 3¼% for value up to 35¢. The drop in the market on April 22 was held to be a result of a relief in tension after the release, by the owners, of the Dutch rubber-carrying steamer *Bidevind,* held up temporarily in Bermuda.



New York Outside Market—Spot Ribbed Smoked Sheets

Although some slight tapering off in United States crude rubber consumption may be expected during the second quarter of 1940, April consumption, it is believed, will be near the March figure of 50,192 long tons.

According to the R.M.A., reexports of crude rubber from the United States during March dropped to 670 long tons from the 1,291 long tons reexported in February. Major purchasers of the latter were: Spain, Belgium, Latvia, Canada, Estonia, Lithuania, and Italy.

New York Outside Market

The outside market continued fairly active during April with factories buying on the market advance. Shipment offerings, although generally light through the month, were taken by local importers. The market, in company with the futures market, was strong; No. 1 ribbed smoked sheets closed at 18½¢ per pound on March 28 and then advanced sharply during April to close at 20¢ per pound on April 20, but lost ground on April 22, when it closed at 19½¢. The closing price on April 27 was 19⅝¢ per pound, with the market stronger.

The week-end closing prices on No. 1 ribbed smoked sheets follow: March 30, 18⅜¢; April 6, 18⅞¢; April 13, 18⅞¢; April 20, 20¢; and April 27, 19⅝¢.

New York Quotations

New York outside market rubber quotations in cents per pound

	Apr. 25, 1939	Mar. 27, 1940	Apr. 26, 1940
Plantations			
Rubber latex..*gal.*	59/60	73/74	76/77
Paras			
Upriver fine.....	13½	17⅞	18¼
Upriver fine.....	*16½	*19¾	*20¾
Upriver coarse ...	9¾	11½	11½
Upriver coarse ...	*14¾	*17½	*17½
Islands fine.....	13¼	17¼	18
Islands fine.....	*15¾	*19¾	*20
Acre, Bolivian fine	13¾	17½	18½
Acre, Bolivian fine	*16¾	*20	*21
Beni, Bolivian fine	14¼	17½	19
Madeira fine	13½	17⅛	18¼
Caucho			
Upper ball	9¼	11½	11½
Upper ball	*14¾	*17¼	*17½
Lower ball	9½	11¼	11
Pontianak			
Pressed block	8¾/15	13/18	13/17
Guayule			
Ampar	13¼	15	15
Africans			
Rio Nuñez	14	18½	18½
Black Kassai	14	18½	18½
Prime Niger flake	25	22½	22½
Gutta Percha			
Gutta Siak	9	17	17½
Gutta Soh	15	28	27
Red Macassar ...85/1.20		1.20	1.20
Balata			
Block Ciudad Bolivar	..	..	40
Manaos block ...	30	45	40
Surinam sheets ..	41	50	45
Amber	43	..	50

*Washed and dried crepe. Shipments from Brazil.

V-Belt Fasteners

(*Continued from page* 53)

Each half of a fastener has its bushing and its rocker pin, and the two halves are joined by flat links. With the new fasteners it is possible to install and maintain matched lengths of V-belts on multiple drives without the necessity of dismantling the drive. Desired V-belt drives can be made from belting in stock. Flexible Steel Lacing Co.

Alligator Fastener

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	March, 1940						April, 1940																	
	25	26	27	28	29	30	1	2	3	4	5	6	8	9	10	11	12	13	15	16	17	18	19	20
No. 1 Ribbed Smoked Sheet.	18⅝	18⅜	18⅞	18½	18⅜	18⅜	18½	18⅝	18⅞	18⅜	18⅞	18⅞	18⅞	19	18⅞	18⅛	18⅞	18⅞	19	19⅜	19¼	20	20	20
No. 1 Thin Latex Crepe....	19	18¾	18⅛	18⅞	18¾	18¾	18⅞	19	18⅛	18¾	18⅛	18⅛	18⅛	19⅜	19¼	19⅞	19¼	19¼	19⅜	19¾	20⅛	20	20	20
No. 2 Thick Latex Crepe...	18⅞	18⅝	18⅞	18¾	18⅝	18⅝	18¾	18⅞	18⅛	18⅝	18⅛	18⅛	18⅛	19¼	19⅛	19⅞	19⅛	19¼	19⅝	20	20	20	20	20
No. 1 Brown Crepe.....	18⅛	17⅞	17⅛	18	17⅞	17⅞	18	18⅛	18⅛	17⅞	17⅛	18⅛	18⅛	18½	18⅜	18⅛	18⅜	18⅜	18½	18⅞	19¼	19	19	19
No. 2 Brown Crepe.....	17⅞	17⅝	17⅞	17¾	17⅝	17⅝	17¾	17⅞	17⅛	17⅝	17⅛	17⅛	17⅛	18¼	18⅛	18⅞	18⅛	18⅛	18¾	18⅝	19	18⅞	18⅞	18⅞
No. 2 Amber.....	18⅛	17⅞	17⅛	18	17⅞	17⅞	18	18⅛	18⅛	17⅞	17⅛	18⅛	18⅛	18½	18⅜	18⅛	18⅜	18⅜	18½	18⅞	19¼	19	19	19
No. 3 Amber.....	17⅞	17⅝	17⅞	17¾	17⅝	17⅝	17¾	17⅞	17⅛	17⅝	17⅛	17⅛	17⅛	18¼	18⅛	18⅛	18⅛	18⅛	18¾	18⅝	19	18⅞	18⅞	18⅞
Rolled Brown.....	15¼	15	14⅛	15⅜	15	15	15⅜	15¼	15⅛	15	15⅛	15⅛	15⅛	15⅝	15½	15⅛	15½	15½	15⅜	16	16⅜	16	16	16

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U.S. Importers*	U S. Consumption¶	U. S. Stocks Mfrs. Dealers Importers Etc.†	Stocks U.S. Afloat†	U.K.—Public Warehouses, London Liverpool†‡	Singapore and Penang Dealers and Port Stocks†‡	World Production (Net Exports)‡	World Consumption Estimated‡	World Stocks†‡§
1937	584,851	543,600	262,204	63,099	57,785	44,792	1,139,800	1,105,002	646,252
1938	400,178	437,031	231,500	45,105	86,853	27,084	894,900	942,252	596,498
1939	499,473	592,000	125,800	91,095	.....	15,299	1,005,209	1,087,622	.....
1939									
Jan.	39,082	47,387	220,727	48,210	80,643	30,975	87,661	89,034	585,441
Feb.	36,490	43,422	207,882	55,814	75,517	28,559	77,290	83,867	568,780
Mar.	38,989	51,416	201,752	55,981	72,235	23,255	76,839	95,044	545,459
Apr.	29,601	45,268	188,074	57,918	68,931	22,434	73,896	86,882	518,651
May	47,535	45,484	187,980	54,046	66,020	20,849	70,812	89,305	511,847
June	35,947	48,438	173,493	51,274	63,878	19,563	65,045	90,952	500,837
July	36,739	44,975	165,450	52,990	57,234	27,042	84,500	87,901	497,126*a*
Aug.	38,045	51,740	152,029	66,717	44,917	20,543	92,408	96,962	477,666*a*
Sept.	41,939	51,402	136,824	68,310	.....	23,457	87,338	84,913	.....
Oct.	41,250	57,155	119,404	100,500	.....	25,376	115,161	95,200	.....
Nov.	42,706	55,677	105,205	114,044	.....	22,957	85,712	95,636	.....
Dec.	71,395	49,636	125,800*b*	91,095	.....	15,299	88,538	91,926	.....
1940									
Jan.	72,496	54,978	156,830*b*	90,285*b*	.....	35,928	108,277	97,124	.....
Feb.	43,088	49,832	148,776*b*	112,257 *b*	.....	33,608	112,475	93,882	.....
Mar.	59,258	50,192	149,678*b*	113,619*b*	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. *a* Not including stocks at French dealers. *b*. Includes government barter rubber.

THE R. M. A. estimates U. S. rubber manufacturers during March consumed 50,192 long tons of crude rubber, against 49,832 long tons in February and 50,165 long tons in March, 1939.

Gross imports for March, as reported by the Department of Commerce, were 59,258 long tons, 37.5% above the February figure of 43,088 long tons and 52% over the 38,989 long tons imported in March, 1939.

Total domestic stocks on March 31 are estimated by the R. M. A. to be 149,678 long tons, less than 1% over the 148,776 long tons on hand on February 29, but 27.3% under the 205,936 long tons on hand March 31, 1939.

Crude rubber afloat to United States ports on March 30 is estimated at 113,619 long tons, compared with 112,257 long tons on February 29 and 55,981 long tons afloat March 30, 1939.

The figures for the end of March, 1940, stocks and rubber afloat include U. S. government emergency rubber at 4,675 and 13,177 long tons, respectively.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for February, 1940:

Rubber Gross Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham.

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex and Other Forms of Latex Tons
United Kingdom	9,864	346
United States	28,270	1,362
Continent of Europe	13,122	419
British possessions	5,341	50
Japan	2,819	46
Other countries	465	1
Totals	59,881	2,224

Rubber Imports: Actual, by Land and Sea.

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	6,095	166
Dutch Borneo	1,838	2
Java and other Dutch islands.	322	1
Sarawak	2,628	28
British Borneo	471	25
Burma	232	22
Siam	3,059	828
French Indo-China	567	159
Other countries	139	16
Totals	15,351	1,247

Eastern and Southern

(*Continued from page 57*)

Bruce Bedford, president, Luzerne Rubber Co., Trenton, N. J., has returned with Mrs. Bedford from a five weeks' stay at Sanibel Island, Fla. Vice President Hugh H. Bedford is cruising with his wife in the Virgin Islands.

Crescent Insulated Wire & Cable Co., Trenton, N. J., laid off more help because of declining orders. C. Edward Murray, Jr., vice president, and his wife have returned from a long stay at Pinehurst, N. C. Mr. Murray and William J. B. Stokes, 2d, president of the Stokes Rubber Co., Trenton, have petitioned the City Commission of Trenton to eliminate flood conditions in the Assunpink Creek, for both concerns have suffered heavy losses through the high waters in the creek during the past several years.

Puritan Rubber Co. and **Jos. Stokes Rubber Co.,** both of Trenton, N. J., report declining business. The Canadian plant of the latter concern, however, is busy.

The Continental Machinery Co., has moved from 277 Broadway, New York, N. Y., to larger quarters at 305 Broadway.

Pocono Co., Trenton, N. J., found business much improved the past two months and expects a good summer.

Shipments of Crude Rubber from Producing Countries—Long Tons

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Thailand	French Indo-China	Total	Philippines and Oceania	Liberia†	Other Africa	South America	Mexican Guayule	Grand Total
1937.....	469,900	431,700	70,400	9,800	7,200	13,200	25,900	35,600	43,400	1,107,100	1,600*	2,300	9,100	16,300	3,400	1,139,800
1938.....	372,000	298,100	49,500	8,500	6,700	9,500	17,800	41,600	59,200	862,900	2,000*	2,900	9,000*	15,300	2,800	894,900
1939.....	376,755	372,396	61,028	9,241	6,616	11,864	24,014	41,266	65,219	968,399	2,080*	6,102	9,600*	16,094	2,934	1,005,209
1939																
Jan.	24,393	39,049	7,237	764	1,115	1,604	2,342	2,918	4,532	83,954	220	528	800	1,812	347	87,661
Feb.	29,278	25,006	5,495	947	618	664	1,484	5,606	5,293	74,391	158	435	800	1,187	319	77,290
Mar.	29,298	27,934	3,718	773	619	344	1,177	5,401	4,501	73,765	230	427	800	1,407	210	76,839
Apr.	29,779	28,341	2,225	881	379	1,687	2,446	2,660	2,657	71,055	135	533	800	1,206	167	73,896
May	29,598	24,429	2,805	1,002	668	558	1,649	2,782	4,584	68,075	129	500*	800	1,077	231	70,812
June	22,052	27,511	3,707	630	805	332	1,157	1,748	4,663	62,605	140	667	800	676	166	65,054
July	26,013	35,681	5,019	782	503	1,603	3,092	5,599	3,367	81,659	190	516	800	1,071	264	84,500
Aug.	40,973	27,478	5,620	203	213	975	1,749	5,230	7,020	89,461	234	222	800	1,313	378	92,408
Sept.	26,908	37,717	6,064	691	89	429	1,932	4,670	5,943	84,443	94	599	800	1,356	46	87,338
Oct.	49,458	45,005	5,234	665	150	1,730	2,487	2,047	5,022	111,798	122	561	800	1,524	356	115,161
Nov.	35,773	30,325	4,402	370	449	1,322	2,023	1,428	6,540	82,632	254	614	800	1,198	214†	85,712
Dec.	33,232	23,920	9,502	1,533	1,008	616	2,476	1,177	11,097	84,561	174	500*	800	2,267	236†	88,538
1940																
Jan.	26,299	54,154	7,698	839	833	1,858	2,256	5,722	5,238	104,827	200*	600*	900	1,550	200*	108,277
Feb.	45,651	37,283	8,946	1,184*	892	1,164	2,678	4,307	6,931	109,036	200*	477	900	1,662	200*	112,475

*Estimated. †Guayule rubber imports into U.S.A. provisional until export figures from Mexico are received. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

COMPOUNDING INGREDIENTS

THE demand for compounding materials continued heavy during April, with no appreciable let-up in volume foreseen for the balance of the second quarter.

Since the invasion of Scandinavia, shipments of woodflour from Norway have been curtailed, and stocks in this country are reported low. French talc still continues scarce. The demand for clays from the mechanical rubber goods industry increased sharply during March and maintained this level during April, but sales to the sole and heel industry have been light since the first of the year.

Prices, although firm, are generally unchanged. Litharge dropped 0.15¢ per pound, and stearic acid is now quoted ¾¢ per pound lower.

CARBON BLACK. After heavy buying in March prior to the April 1 price advance, sales slackened, but resumed normal proportions in mid-April. Heavier buying is expected for May. Prices are firm and unchanged at the higher levels established April 1. Sales during March exceeded production by 15,000,000 pounds and resulted in reducing stocks during that period to 105,000,000 pounds, against 149,000,000 pounds at the end of March, 1939, and 125,000,000 at the beginning of 1940.

FACTICE OR RUBBER SUBSTITUTE. The demand continued steady, although below normal for this season of the year. Prices are unchanged.

LITHARGE. The price was reduced ¼¢ per pound and then advanced 1/10¢ per pound, resulting in a net reduction of 0.15¢. Demand was reported good.

LITHOPONE. A heavier call for stocks was reported. The price is firm.

RUBBER CHEMICALS. The demand for accelerators and antioxidants was reported to be holding up to the high level of March. Prices are generally unchanged.

RUBBER SOLVENTS. No let-up in demand was evidenced, and tire manufacturers continued to be heavy buyers. The price is steady.

TITANIUM PIGMENTS. Volume during April was reported the highest for any month of this year so far. Reports that there will be a limited demand for white footwear in the 1940 season has not yet been borne out through curtailed purchases. Imported raw materials, ilmenite and rutile, continue to arrive steadily. Prices are unchanged.

ZINC OXIDE. Sales volume increased considerably during April, and volume for the second quarter is expected to be much in excess of normal requirements for that period. Prices are unchanged.

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.03 / $.035
Rottenstone, domestic	lb.	.03 / .035
Silica, 15	ton	

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	ton	20.00
Litharge (commercial)	lb.	.0675/ .0725

Accelerators, Organic

A-1	lb.	.24 / .30
A-10	lb.	.31 / .35
A-11	lb.	.52 / .65
A-19	lb.	.52 / .65
A-32	lb.	.70 / .80
A-77	lb.	.42 / .55
A-100	lb.	.42 / .55
Accelerator 49	lb.	.40 / .42
737	lb.	.42 / .43
737-50	lb.	.25 / .26
808	lb.	.70 / .72
833	lb.	1.15
Acrin	lb.	.60
Aldehyde ammonia	lb.	.65 / .70
Altax	lb.	.55 / .60
B-J-F	lb.	.50 / .55
Beutene	lb.	.70 / .75
Butyl Eight	lb.	.98 / 1.00
Zimate	lb.	2.50
C-P-B	lb.	2.00
Captax	lb.	.50 / .55
Crylene	lb.	.40 / .47
Paste	lb.	.30 / .36
D-B-A	lb.	2.00
Delac A	lb.	.40 / .50
O	lb.	.40 / .50
P	lb.	.40 / .50
Di-Esterex-N	lb.	.60 / .70
DOTG (Di-ortho-tolyguanidine)	lb.	.44 / .46
DPG (Diphenylguanidine)	lb.	.35 / .45
El-Sixty	lb.	.50 / .65
Ethylideneaniline	lb.	.42 / .43
Ethyl Zimate	lb.	2.50
Formaldehyde P.A.C.	lb.	.0625
Formaldehydeaniline	lb.	.31
Formaldehyde-para-toluidine	lb.	.52 / .54
Guantal	lb.	.40 / .50
Hepteen	lb.	$0.35 /$0.40
Base	lb.	1.35 / 1.50
Hexamethylenetetramine U.S.P.	lb.	.39
Technical	lb.	.33
Lead oleate, No. 999	lb.	.13
Witco	lb.	.15
Ledate	lb.	2.35
Monex	lb.	2.35
Novex	lb.	
O. N. V.	lb.	1.00 / 1.10
O-X-A-F	lb.	.50 / .55
Ovac	lb.	.50 / .55
Para-nitroso-dimethylaniline	lb.	.85
Pentex	lb.	1.00 / 1.10
Flour	lb.	.15 / .16
Pip-Pip	lb.	2.50
Pipsolene	lb.	1.55 / 1.85
R-2	lb.	1.40 / 1.80
R-23	lb.	.40
R & H 50-D	lb.	.42 / .43
Rotax	lb.	.60 / .65
Safex	lb.	1.20 / 1.30
Santocure	lb.	.80 / 1.00
Selenac	lb.	2.75
Super-sulphur No. 1	lb.	.50
3	lb.	.18 / .20
Tetrone A	lb.	2.70
Thiocarbanilide	lb.	.24 / .30
Thionex	lb.	2.35
Thiurad	lb.	2.35
Trimene	lb.	.55 / .65
Base	lb.	1.05 / 1.20
Triphenylguanidine (TPG)	lb.	.45
Tuads	lb.	2.35
Ureka	lb.	.60 / .75
Blend B	lb.	.60 / .75
C	lb.	.56 / .65
Vulcanex	lb.	.42 / .43
Vulcanol	lb.	.85
Z-B-X	lb.	2.50
Zenite	lb.	.46 / .48
A	lb.	.53 / .55
B	lb.	.46 / .48
Zimate	lb.	2.35

Activators

Aero Ac 50	lb.	.46 / .56
Barak	lb.	.50

Age Resisters

AgeRite Alba	lb.	1.50 / 1.65
Exel	lb.	1.00 / 1.02
Gel	lb.	.57 / .59
Hipar	lb.	.65 / .67
Powder	lb.	.52 / .54
Age-Rite Resin D	lb.	.52 / .54
White	lb.	1.25 / 1.40
Akroflex C	lb.	$0.56 /$0.58
Albasan	lb.	.70 / .75
Aminox	lb.	.52 / .61
Antox	lb.	.56
B-L-E	lb.	.52 / .61
Powder	lb.	.65 / .74
B-X-A	lb.	.52 / .61
Copper Inhibitor X-872-A	lb.	1.15
Flectol B	lb.	.52 / .65
H	lb.	.52 / .65
White	lb.	.90 / 1.15
M-U-F	lb.	1.50
Neozone (standard)	lb.	.63
A	lb.	.52 / .54
B	lb.	.63
C	lb.	.52 / .54
D	lb.	.52 / .54
E	lb.	.63
Oxynone	lb.	.64 / .80
Parazone	lb.	.68
Permalux	lb.	1.20
Santoflex B	lb.	.52 / .65
Solux	lb.	1.30
Thermoflex A	lb.	.65 / .67
Tysonite	lb.	.16
V-G-B	lb.	.52 / .61

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 *lbs.*	2.70 / 3.55
liquid, 50%	100 *lbs.*	1.95
solid (700-*lb. drums*)	100 *lbs.*	2.30 / 3.15

Antiscorch Materials

A-F-B	lb.	.35 / .40
Antiscorch T	lb.	.90
Cumar RH	lb.	.10
E-S-E-N	lb.	.35 / .40
R-17 Resin (*drums*)	lb.	.10
RM	lb.	1.25
Retarder W	lb.	.36
U.T.B.	lb.	.35 / .40

Antisun Materials

Heliozone	lb.	.22 / .23
Sunproof	lb.	.22 / .27

Brake Lining Saturant

B.R.T. No. 3	lb.	.0165/ .0175

Colors

Black

Du Pont powder	lb.	.42 / .44
Lampblack (commercial), *l.c.l.*	lb.	.15

Blue

Brilliant	lb.	
Du Pont dispersed	lb.	.83 / 3.95
Powders	lb.	2.25 / 3.75
Toners	lb.	.08 / 3.85

Brown

Mapico	lb.	.11

Green

Brilliant	lb.	
Chrome, light	lb.	
medium	lb.	.22
oxide (*freight allowed*)	lb.	
Dark	lb.	
Du Pont dispersed	lb.	.98 / 1.75
Powders	lb.	1.00 / 5.50
Guignet's (*bbls.*)	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.75

Orange

Du Pont dispersed	lb.	.88 / .98
Powders	lb.	.88 / 2.75
Lake	lb.	
Toners	lb.	.40 / 1.60

Orchid

Toners	lb.	1.50 / 2.00

Pink

Toners	lb.	1.50 / 2.00

Purple

Permanent	lb.	
Toners	lb.	.60 / 2.10

Red

Antimony Crimson, 15/17%	lb.	
R. M. P. No. 3	lb.	.48
Sulphur free	lb.	
R.M.P.	lb.	.52
Golden 15/17%	lb.	
7-A	lb.	.37
Z-2	lb.	.23
Cadmium, light (400-*lb. bbls.*)	lb.	.75 / .80
Chinese	lb.	
Crimson	lb.	
Du Pont dispersed	lb.	.93 / 2.05
Powders	lb.	.285 / .90
Mapico	lb.	.0925
Medium	lb.	
Rub-Er-Red (*bbls.*)	lb.	.0925
Scarlet	lb.	.08 / 2.00
Toners	lb.	.08 / 2.00

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Prices not recorded will be supplied upon request.

White

Lithopone (*bags*)	*lb.*	$0.0360/$0.0385
Albalith	*lb.*	.0360/ .0385
Astrolith (50-*lb. bags*)	*lb.*	.0360/ .0385
Azolith	*lb.*	.0360/ .0385
Cryptone-BA-19	*lb.*	.05 / .0525
BT	*lb.*	.05 / .0525
CB	*lb.*	.05 / .0525
ZS No. 20	*lb.*	.075 / .0775
86	*lb.*	.075 / .0775
230	*lb.*	.075 / .0775
Sunolith	*lb.*	.0360/ .0385
Ray-Bar	*lb.*	.0525/ .0575
Ray-Cal	*lb.*	.05 / .0525
Rayox	*lb.*	.13
Titanolith (50-*lb. bags*)	*lb.*	.05 / .0525
Titanox-A (50-*lb. bags*)	*lb.*	.13 / 1375
B (50-*lb. bags*)	*lb.*	.0525/ .0550
30 (50-*lb. bags*)	*lb.*	.0525/ .0550
C (50-*lb. bags*)	*lb.*	.05 / .0525
M (50-*lb. bags*)	*lb.*	.0525/ .0550
Ti-Tone	*lb.*	
Zinc Oxide		
Azo ZZZ-11	*lb.*	.0625/ .0650
44	*lb.*	.0625/ .0650
55	*lb.*	.0625/ .0650
66	*lb.*	.0625/ .0650
French Process, Florence		
Green Seal-8	*lb.*	.08 / .0825
Red Seal-9	*lb.*	.075 / .0775
White Seal-7	*lb.*	.085 / .0875
Kadox, Black Label-15	*lb.*	.065 / .0675
No. 25	*lb.*	.075 / .0775
Red Label-17	*lb.*	.065 / .0675
Horse Head Special 3	*lb.*	.0625/ .065
XX Red-4	*lb.*	.0625/ .065
23	*lb.*	.0625/ .065
72	*lb.*	.0625/ .065
78	*lb.*	.0625/ .065
80	*lb.*	.0625/ .065
103	*lb.*	.0625/ .065
110	*lb.*	.0625/ .065
St. Joe (lead free)		
Black Label	*lb.*	.0625/ .065
Green Label	*lb.*	.0625/ .065
Red Label	*lb.*	.0625/ .065
U.S.P.	*lb.*	.095 / .0975
White Jack	*lb.*	.075 / .0775
Zopaque (50-*lb. bags*)	*lb.*	.13 / .1375

Yellow

Cadmolith (cadmium yellow). (400-*lb. bbls.*)	*lb.*	.50 / .55
Du Pont dispersed	*lb.*	1.25 / 1.75
Powders	*lb.*	.135 / 2.75
Lemon	*lb.*	
Mapico	*lb.*	.0675
Toners	*lb.*	2.50

Dispersing Agents

Bardex	*lb.*	.041 / .042
Bardol	*lb.*	.0245/ .045
Darvan	*lb.*	.30 / .39
Nevol (*drums, c.l.*)	*lb.*	.0245
Santomerse S	*lb.*	.11 / .25

Fillers, Inert

Asbestine, *c.l.*	*ton*	15.00
Barytes	*ton*	30.00 /36.00
f.o.b., St. Louis (50-*lb. paper bags*)	*ton*	22.85
off color, domestic	*ton*	20.00 /25.00
white, imported	*ton*	29.00 /32.00
Blanc fixe, dry, precip.	*lb.*	.03 / .035
Calcene	*ton*	37.50 /43.00
Infusorial earth	*lb.*	.02 / .03
Kalite No. 1	*ton*	24.00 /30.00
3	*ton*	34.00 /40.00
Kalvan	*ton*	121.00
Magnesia, calcined, heavy	*lb.*	.04
Carbonate, *l.c.l.*	*lb.*	.0725/ .095
Paradene No. 2 (*drums*)	*lb.*	.045
Pyrax A	*ton*	6.00 /20.00
Whiting		
Columbia Filler	*ton*	9.00 /14.00
Guilders	100 *lbs.*	
Paris white, English cliff-stone	100 *lbs.*	
Southwark Brand (commercial)	100 *lbs.*	
All other grades	100 *lbs.*	
Suprex, white extra light	*ton*	45.00
heavy	*ton*	45.00
Witco, *c.l.*	*ton*	6.00

Finishes

Rubber lacquer, clear	*gal.*	
colored	*gal.*	
Starch, corn, pwd.	100 *lbs.*	
potato	*lb.*	
Talc	*ton*	.025 / .035

Flock

Cotton flock, dark	*lb.*	.10 / .12
dyed	*lb.*	.40 / .88
white	*lb.*	.11 / .20
Rayon flock, colored	*lb.*	1.00 / 2.00
white	*lb.*	.75 / 1.00

Latex Compounding Ingredients

Accelerator 85	*lb.*	.35
89	*lb.*	1.40
122	*lb.*	1.55
552	*lb.*	2.50
Aerosol OT Aqueous 10%	*lb.*	$0.15 /$0.175
Antox, dispersed	*lb.*	.42
Aquarex A	*lb.*	.35
D	*lb.*	.75
F	*lb.*	.85
WA Paste	*lb.*	.28
Areskap No. 50	*lb.*	.18 / .24
100, dry	*lb.*	.39 / .51
Aresket No. 240	*lb.*	.16 / .22
300, dry	*lb.*	.42 / .50
Aresklene No. 375	*lb.*	.35 / .50
400, dry	*lb.*	.51 / .65
Black No. 25, dispersed	*lb.*	.22 / .40
Catalpo	*ton*	
Collocarb	*lb.*	.07
Color Pastes, dispersed	*lb.*	.35 / 1.90
Compound G-11 NW	*lb.*	
Dispersex No. 15	*lb.*	.11 / .12
No. 20	*lb.*	.08 / .10
Emo, brown	*lb.*	.07 / .10
white	*lb.*	.15
Factice Compound, dispersed	*lb.*	.36
Heliozone, dispersed	*lb.*	.25
Igepon A	*lb.*	
Latac	*lb.*	
MICRONEX, Colloidal	*lb.*	.055 / .0655
Nekal BX (dry)	*lb.*	
Palmol	*lb.*	.11
Pipsol X	*lb.*	3.05 / 3.55
R-2 Crystals	*lb.*	2.50 / 2.75
R-23	*lb.*	.40
RN-2	*lb.*	2.00 / 2.25
Crystals	*lb.*	2.00 / 2.25
S-1 (400-*lb. drums*)	*lb.*	.65
Santobrite Briquettes	*lb.*	.17 / .26
Powder	*lb.*	.16 / .26
Santomerse D	*lb.*	.41 / .65
S	*lb.*	.11 / .25
No. 1	*lb.*	.18 / .35
No. 2	*lb.*	.18 / .35
No. 3	*lb.*	.40 / .65
No. 3P	*lb.*	.29 / .45
Santovar A	*lb.*	1.15 / 1.40
Stablex A	*lb.*	.90 / 1.10
B	*lb.*	.65 / .90
C	*lb.*	.40 / .50
Sulphur, dispersed	*lb.*	.10 / .15
No. 2	*lb.*	.075
T-1 (400-*lb. drums*)	*lb.*	.40
Tepidone	*lb.*	1.20
Vulcan Colors	*lb.*	
Zinc oxide, dispersed	*lb.*	.12 / .15

Mineral Rubber

Black Diamond	*ton*	25.00
B.R.C. No. 20	*lb.*	.009 / .01
Hydrocarbon, hard	*ton*	23.00
Genasco Hydrocarbon, granulated	*ton*	
solid	*ton*	
Gilsonite	*ton*	
Parmr	*ton*	
Pioneer	*ton*	
285°-300°	*ton*	23.00 /42.00

Mold Lubricants

Mold Paste	*lb.*	.12 / .18
Sericite	*ton*	65.00 /75.00
Soapbark	*lb.*	
Soapstone, *l.c.l.*	*ton*	25.00 /35.00

Oil Resistant

AXF	*lb.*	.40 / .50

Reclaiming Oils

B.R.V.	*lb.*	.032 / .0345
No. 1621	*lb.*	.0195/ .022
S.R.O.	*lb.*	.0195/ .0205
X-159	*gal.*	.20

Reenforcers

Carbon Black		
Aerfloted Arrow Specification (*bags only*)	*lb.*	.0265†
Arrow Compact Granulized	*lb.*	.0265†
Certified Heavy Compressed (*bags only*)	*lb.*	.0265†
Spheron	*lb.*	.0265†
Continental, dustless	*lb.*	.0265†
Compressed (*bags only*)	*lb.*	.0265†
Disperso	*lb.*	.0265†
Dixie	*lb.*	.0265†
Dixiedensed	*lb.*	.0265†
66	*lb*	.0265†
Excello, dustless	*lb.*	.0265†
Fumonex	*lb.*	.03
Gastex	*lb.*	.03 / .07
Kosmobile	*lb.*	.0265†
66	*lb.*	.0265†
Kosmos	*lb.*	.0265†
MICRONEX Beads	*lb.*	.0265†
Mark II	*lb.*	.0265†
Standard	*lb.*	.0265†
W-5	*lb.*	.0265†
W-6	*lb.*	.0265†
P-33	*lb.*	.0475 / .0725
Pelletex	*lb.*	.03 / .07
Supreme, dustless	*lb.*	.0265†
Thermax	*lb.*	$0.02 /$0.0475
Velvetex	*lb.*	.022 / .035
"WYEX BLACK"	*lb.*	.0265†
Carbonex	*lb.*	.029 / .034
S	*lb.*	.0315 / .0360
Clays		
Aerfloted Paragon (50-*lb. bags*)	*ton*	10.00
Suprex (50-*lb. bags*)	*ton*	10.00
Barden	*ton*	10.00
Chicora	*ton*	10.00
China	*ton*	17.50 /20.00
Crown	*ton*	10.00
Dixie	*ton*	10.00 /22.50
Hi-White	*ton*	10.00
Langford	*ton*	8.50
NcNamee	*ton*	10.00 /22.50
Par	*ton*	10.00
Witco, *c.l.*	*ton*	10.00
Cumar EX	*lb.*	.045
MH	*lb.*	.065 / .11
V	*lb.*	.09 / .12

Reodorants

Amora A	*lb.*	
B	*lb.*	
C	*lb.*	
D	*lb.*	
Compound G-4	*lb.*	
G-11	*lb.*	
Curodex 19	*lb.*	2.75
188	*lb.*	3.50
198	*lb.*	4.50
Para-Dors	*lb.*	
Rodo No. 0	*lb.*	3.50 / 4.00
10	*lb.*	4.50 / 5.00

Rubber Substitutes

Black	*lb.*	.08 / .12
Brown	*lb.*	.08 / .113
White	*lb.*	.085 / .135
Factice		
Amberex	*lb.*	.305
Brown	*lb.*	.08 / .11
Fac-Cel B	*lb.*	.13
C	*lb.*	.13
Neophax A	*lb.*	.0975
B	*lb.*	.0975
White	*lb.*	.08 / .125

Softeners

Bondogen	*lb.*	.98 / 1.25
Burgundy pitch	*lb.*	.06
Cycline oil	*gal.*	.14 / .20
Dispersing Oil No. 10	*lb.*	.0335/ .036
Nuba resinous pitch (*drums*)		
Grades No. 1 and No. 2	*lb.*	.0265
Nubalene Resin	*lb.*	.025
Palm oil (Witco), *c.l.*	*lb.*	
Pine tar	*gal.*	
Plastogen	*lb.*	.0775/ .10
R-19 Resin (*drums*)	*lb.*	.10
21 Resin (*drums*)	*lb.*	.10
Reogen	*lb.*	.115 / .22
Rosin oil, compounded	*gal.*	.40
RPA No. 1	*lb.*	.65
2	*lb.*	.65
3	*lb.*	.46
Rubtack	*lb.*	.10
Tackol	*lb.*	.085 / .18
Tonox	*lb.*	.52 / .61
Tonox D	*lb.*	.75 / .85
Witco No. 20, *l.c.l.*	*gal.*	.20
X-1 resinous oil (*tank car*)	*lb.*	.01

Softeners for Hard Rubber Compounding

Resin C Pitch 45°C. M.P.	*lb.*	.013 / .014
60°C. M.P.	*lb.*	.013 / .014
75°C. M.P.	*lb.*	.013 / .014

Solvents

Beta-Trichlorethane	*gal.*	
Carbon bisulphide	*lb.*	
tetrachloride	*lb.*	
Cosol No. 1	*gal.*	.25 / .30
No. 2	*gal.*	.20 / .28
No. 3	*gal.*	.20 / .28
Industrial 90% benzol (*tank car*)	*gal.*	.16
Skellysolve	*gal.*	

Stabilizers for Cure

Laurex (*bags*)	*lb.*	.1075/ .1325
Stearex B	*lb.*	.10 / .11
Beads	*lb.*	.0975/ .1075
Stearic acid, single pressed	*lb.*	.10 / .11
Stearite, *c.l.*	100 *lbs.*	9.75
Zinc stearate	*lb.*	.24 / .26

Synthetic Rubber

Neoprene Type E	*lb.*	.65
G	*lb.*	.70
GW	*lb.*	.75
H	*lb*	.78
M	*lb.*	.65
Latex Type 57	*lb.*	.30

Tackifier

B.R.H. No. 2	*lb.*	.017 / .02

Varnish

Shoe	*gal.*	1.45

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is 2.50¢ per pound; f.o.b. Hoboken (bulk), 3.38¢; f.o.b. No. Atlantic Docks (bags), 3.525¢. All prices are carlot.

(*Continued on page* 80)

THE BEAD CHAIN LOOP *ON SLIDE FASTENERS . . .*

Wet, cold, gloved fingers readily grasp the BEAD CHAIN* loop so extensively used on slide fasteners. It is an appreciated addition to purchasers of bathing bags, rain coats, arctics and other rubber items.

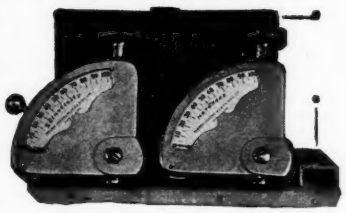
BEAD CHAIN* is ideal, too, for holding caps on hot water bottles and ice bags. It revolves naturally, and cannot kink or tangle.

Our engineering department is prepared to cooperate with manufacturers in the design of assemblies where the use of chain is necessary or desirable.

THE BEAD CHAIN MANUFACTURING CO.
* REG. U.S. PAT. OFF. 32 MT. GROVE ST., BRIDGEPORT, CONN.

An International Standard of Measurement for—
Hardness • Elasticity • Plasticity of Rubber, etc.

Is the DUROMETER and ELASTOMETER (23rd year)



These are all factors vital in the selection of raw material and the control of your processes to attain the required modern Standards of Quality in the Finished Product. Universally adopted.

It is economic extravagance to be without these instruments. Used free handed in any position or on Bench Stands, convenient, instant registrations, fool proof. *Ask for our Descriptive Bulletins, and Price List R-4 and R-5.*

THE SHORE INSTRUMENT & MFG. CO.
Van Wyck Avenue and Carll Street, JAMAICA, NEW YORK
Agents in all foreign countries.

FINELY PULVERIZED—BRILLIANT
COLORS
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Chicago Representative
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Cleveland, PALMER-SCHUSTER CO., 975-981 Front St.

Manufactured by
BROOKLYN COLOR WORKS, INC.
Morgan and Norman Avenues Brooklyn, N. Y.

Regular and Special Constructions
of
COTTON FABRICS

Single Filling Double Filling
and
ARMY
Ducks

HOSE and BELTING
Ducks

Drills

Selected
Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Feb. 24	Mar. 30	Apr. 6	Apr. 13	Apr. 20
Mar.	11.30	.....	.....	.....	.....
Apr.	.....	10.84	10.90	10.97	.....
May	.....	10.74	10.80	10.87	10.90
July	10.63	10.52	10.54	10.59	10.64
Sept.	10.19	10.14	10.15	10.26	10.34
Dec.	9.76	9.72	9.70	9.91	10.03
Feb.	.....	9.62	9.61	9.82	9.83
Mar.	.....	9.58	9.56	9.77	9.89

THE cotton market strengthened somewhat during April. After closing at 10.99¢ per pound on March 28, the New York 1 1/16-inch spot middling price advanced gradually through April, closing at 11.16¢ per pound on April 22. The closing price on April 29 was 11.14¢ per pound, with the market steady.

The Census Bureau reported March consumption of all cotton, exclusive of linters, in domestic mills at 626,331 bales, against 662,659 in February and 649,940 in March, 1939. Exports of cotton in March totaled 433,842 bales, against 746,680 bales in February and 330,070 bales in March, 1939.

On April 4 Secretary of Agriculture Henry A. Wallace announced that a cotton stamp program would be launched in 30 days for increasing distribution of cotton goods to low income families in Memphis and surrounding Shelby County, Tenn. The program is similar to the food stamp plan.

The Department of Agriculture estimated that world carryover of American cotton on August 1 will total about 13,000,000 bales, or only 1,000,000 bales less than world stocks held the same date last year. It was believed that domestic demand would bring the carryover in the United States down 2,000,000 bales to about 11,000,000 bales on August 1.

Fabrics

During the last week of March and the first two weeks of April the demand for fabrics was at a high level, with mills selling about seven weeks' production. Thereafter the market entered a period of digestion with demand slowing up considerably. Owing to the cool weather the spring raincoat business has been retarded, but recent indications point toward an immediate big improvement.

The market in general is easier, with price reductions registered on some types of constructions, mainly drills, ducks, osnaburgs, and raincoat fabrics. Tire fabrics and hollands are steady and unchanged; while sheetings are mainly firm.

New York Quotations

April 24, 1940

Drills		
38-inch 2.00-yard	yd.	$0.12
40-inch 3.47-yard		.07
50-inch 1.52-yard		.16¼
52-inch 1.85-yard		.13½
52-inch 1.90-yard		.13⅜
52-inch 2.20-yard		.12
52-inch 2.50-yard		.10⅝
59-inch 1.85-yard		.13¼
Ducks		
38-inch 2.00-yard D. F.	yd.	.12 /.12½
40-inch 1.45-yard S. F.		.16⅝
51¼-inch 1.35-yard D. F.		.18½
72-inch 1.05-yard D. F		.25 /.26
72-inch 17.21-ounce		.28
Mechanicals		
Hose and belting	lb.	.26
Tennis		
52-inch 1.35-yard	yd.	.19¼
Hollands		
Gold Seal and Eagle		
20-inch No. 72	yd.	.10
30-inch No. 72		.18
40-inch No. 72		.20
Red Seal and Cardinal		
20-inch	yd.	.08½
30-inch		.15¾
40-inch		.17
50-inch		.26
Osnaburgs		
40-inch 2.34-yard	yd.	.10⅛
40-inch 2.48-yard		.09⅝
40-inch 2.56-yard		.08⅜
40-inch 3.00-yard		.08
40-inch 7-ounce part waste		.08½
40-inch 10-ounce part waste		.12
37-inch 2.42-yard		.09⅞
Raincoat Fabrics		
Cotton		
Bombazine 60 x 64	yd.	.07¾
Plaids 60 x 48		.10¼
Surface prints 60 x 64		.11½
Print cloth, 38½-inch, 60 x 64		.05
Sheetings, 40-inch		
48 x 48, 2.50-yard	yd.	.08⅜
64 x 68, 3.15-yard		.08
56 x 60, 3.60-yard		.07
44 x 40, 4.25-yard		.05⅜
Sheetings, 36-inch		
48 x 48, 5.00-yard	yd.	.04½
44 x 40, 6.15-yard		.03⅝
Tire Fabrics		
Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.30½
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.30
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.29½
Cord Fabrics		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.31
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.29
12/4/2 Karded peeler, 1 1/16" cotton	lb.	.28
23/5/3 Karded peeler, 1¼" cotton	lb.	.36½
23/5/3 Combed Egyptian	lb.	.50
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.32½

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption % of Crude	U. S. Stocks*	Exports
1937	185,033	162,000	29.8	28,800	13,233
1938	122,403	120,800	27.6	23,000	7,403
1939	198,815	184,942	32.0	25,427	12,610
1940					
Jan.	20,447	17,596	32.0	25,530	1,059
Feb.	19,060	17,019	34.2	27,019	1,436
Mar.	18,266	17,560	35.0	26,221	...

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage.
Compiled by The Rubber Manufacturers Association, Inc.

RUBBER SCRAP

THE scrap market became more active during April, with reclaimers' production schedules continuing at a high level. The market is steady, and all prices, except inner tubes, continue at last month's quotations. No. 1 floating, red, and mixed tubes are slightly easier; while No. 2 compound tubes are up fractionally.

Consumers' Buying Prices

(Carlot Lots for April 23, 1940)

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01⅛/$0.01¼
Colored	lb.	.00⅞/ .01
Untrimmed arctics	lb.	.00⅞/ .01
Inner Tubes		
No. 1, floating	lb.	.10 / .10½
No. 2, compound	lb.	.04½/ .04¾
Red	lb.	.04¼/ .04½
Mixed tubes	lb.	.03¾/ .04
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	14.00 /15.00
Beadless	ton	17.50 /18.50
Auto tire carcass	ton	30.00 /35.00
Black auto peelings	ton	26.00 /27.00
Solid		
Clean mixed truck	ton	34.00 /35.00
Light gravity	ton	42.00 /44.00
Mechanicals		
Mixed black scrap	ton	20.00 /22.00
Hose, air brake	ton	20.00 /22.50
Garden, rubber covered	ton	12.50 /14.00
Steam and water, soft	ton	12.50 /14.00
No. 1 red	lb.	.03 / .03¼
No. 2 red	lb.	.02¾/ .02½
White druggists' sundries	lb.	.03¾/ .04
Mixed mechanicals	lb.	.02¾/ .02½
White mechanicals	lb.	.03⅝/ .03¾
Hard Rubber		
No. 1 hard rubber	lb.	.11½/ .13

RECLAIMED RUBBER

ACCORDING to R. M. A. figures, March reclaimed rubber consumption is estimated at 17,560 long tons, 3.1% above that of February; production, 18,266 long tons; and stocks on hand March 30, 26,221 long tons. The demand for reclaim during April held up to approximately the same high level of March, with tire and mechanical goods manufacturers buying in good volume.

The market continues steady, and all grades of reclaim hold at previously established price levels.

New York Quotations

April 23, 1940

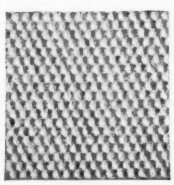
	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¼
Acid	1.18-1.22	7 / 7¼
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
Red Tube	1.15-1.30	9 / 9¼
Compound	1.10-1.20	9 /10
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	12½/14

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

HIS TROUBLE: *He never used a slide rule!*

Spiders have been spinning and weaving the same old fabric since the world began and they do a good job as far as they go—but the development of new weaves and new techniques of weaving requires more than mere repetition. That's why our organization includes not only the mechanical weaving facilities of 17 modern mills, but an equally important staff of textile engineers well equipped with laboratory and research facilities for the development of new textiles and better ways of making old ones.

FOR INSTANCE: *Fabrics for the Rubber Industry* —



Shawmut Belting Duck

are for the most part made differently from usual industrial fabrics. In our Belt clinic we have made exhaustive studies of the causes of the mechanical failure of belting ducks under actual working conditions. Through these studies we have been able to design and construct belting ducks that can deliver remarkable performance under the severest of working conditions. We're always glad to work with you on problems involving the use of fabrics in the rubber industry.

WELLINGTON SEARS COMPANY

65 WORTH STREET • NEW YORK, N. Y.

Rims Approved by The Tire & Rim Association, Inc.

Rim Size	3 Mos., 1940 No.	%	3 Mos., 1939 No.	%
Drop Center Rims, 16" Diameter and Smaller				
15x5.50E	.....	...	151	0.0
16x4.00D	.....	...	16,268	0.4
16x4.25D	1,166	0.0	.....	...
16x4.50D	.....	...	487	0.0
15x3.00D	14,030	0.3	44,068	1.1
15x4.50E	76,373	1.6	.....	...
15x5.00F	57,058	1.2	34,770	0.9
15x5.50F	49,692	1.0	48,147	1.3
16x3.50D	98,112	2.0	86,369	2.2
16x4.00E	2,784,522	57.6	2,241,346	57.3
16x4.25E	372,854	7.7	319,901	8.2
16x4.50E	962,995	19.9	784,809	20.1
16x5.00F	365,877	7.5	300,383	7.7
16x5.50F	4,785	0.1	2,707	0.1
16x6.00F	7,447	0.2	8,786	0.2
Drop Center Rims, 17" Diameter and Larger				
17x3.00D	.....	...	93	0.0
17x3.25E	906	0.0	.....	...
17x3.62F	6,102	0.1	3,590	0.1
17x5.00F	.....	...	215	0.0
18x2.15B	14,894	0.3	7,411	0.2
18x3.00D	377	0.0	1,123	0.0
18x3.25E	339	0.0	433	0.0
18x3.62F	10,463	0.2	5,330	0.1
18x4.00F	.....	...	326	0.0
19x3.00D	32	0.0	.....	...
19x3.25E	2,476	0.0	1,612	0.0
20x3.25E	8	0.0	2,196	0.1
20x3.62F	2,110	0.0	.....	...
21x3.00D	1,688	0.0	.....	...
21x3.25E	4,791	0.1	1,556	0.0
Flat Base Rims for Passenger Cars				
All Sizes	2,857	0.1	1,238	0.0
Clincher Rims				
All Sizes	1,502	0.0	.....	...
15" Truck Rims				
15x7	746	0.1	757	0.1
15x8	568	0.1	.....	...
15x9/10	46	0.0	.....	...
17" Truck Rims				
17x5	14,384	1.7	15,655	1.9
17x6	17,987	2.2	11,198	1.3
17x7	382	0.0	.....	...
18" Truck Rims				
18x5	2,768	0.3	.....	...
18x6	860	0.1	.....	...
18x7	1,211	0.1	3,269	0.4
18x8	228	0.0	1,813	0.2
18x9/10	447	0.1	1,679	0.2
19" Truck Rims				
19x11	1,650	0.2	.....	...
20" Truck Rims				
20x5	138,198	16.7	163,207	19.6
20x6	351,277	42.5	358,153	43.1
20x7	188,837	22.8	158,586	19.1
20x8	47,367	5.7	43,556	5.2
20x9/10	6,383	0.8	6,232	0.8
20x11	1,194	0.1	620	0.1
22" Truck Rims				
22x7	.....	...	310	0.0
22x8	2,990	0.4	2,170	0.3
22x9/10	1,959	0.2	1,531	0.2
24" Truck Rims				
24x6	2,869	0.3	1,131	0.1
24x7	2,915	0.4	456	0.1
24x8	3,642	0.4	1,613	0.2
24x9/10	1,807	0.2	2,241	0.3
24x11	716	0.1	1,855	0.2
Semi-Drop Base Rims for Light Trucks				
16x4.50E	8,152	1.0	21,175	2.5
16x5.50F	28,098	3.4	34,250	4.1
Tractor and Implement Rims				
12x2.50C	1,733	0.7	1,169	0.8
12x3.00D	4,935	1.9	2,710	1.9
13x5.50F	8,205	3.1	709	0.5
15x3.00D	36,677	14.1	5,634	4.0
16x3.00D	3,555	1.4	959	0.7
18x2.50C	1,695	0.7	.....	...
18x3.00D	.....	...	579	0.9
18x5.50F	5,408	2.1	4,077	2.9
19x3.00D	39,136	15.0	.....	...
20x4.50E	1,386	0.5	1,173	0.8
20x5.50F	4,533	1.7	704	0.5
21x3.00D	.....	...	672	0.5
22x4.50E	6,590	2.5	4,036	2.9
24x3.00D	275	0.1	10	0.0
28x4.00E	.....	...	63	0.0
30x3.00D	145	0.1	.....	...
36x3.00D	158	0.1	.....	...
36x4.00E	.....	...	87	0.1
36x4.50E	252	0.1	2,687	1.9
40x3.00D	148	0.1	51	0.0
40x4.50E	.....	...	184	0.1
44x4.00E	.....	...	38	0.0
44x4.50E	.....	...	205	0.1
24x5.50R	788	0.3	5,243	3.7
32x5.50R	56	0.0	.....	...
36x5.50R	284	0.1	4,349	3.1
40x5.50R	669	0.3	2,717	1.9
20x8.00T	506	0.2	.....	...
24x6.00S	2,455	1.0	2,618	1.9
24x8.00T	19,922	7.6	23,767	16.9
28x6.00S	300	0.1	785	0.5
28x8.00T	11,691	4.5	9,015	6.4
32x8.00T	3,768	1.4	3,725	2.6
36x6.00S	11,950	4.6	16,299	11.5
36x8.00T	17,500	6.7	36,804	26.1
40x6.00S	4,510	1.7	9,032	6.4
40x8.00T	509	0.2	882	0.6
42x8.00T	.....	...	21	0.0
24x7WB	12,908	5.0	.....	...
24x8WB	17,376	6.7	.....	...
24x10WB	78	0.0	.....	...
28x9WB	2,347	0.9	.....	...
28x10WB	8,000	3.1	.....	...
32x6WB	5,258	2.0	.....	...
32x7WB	5,329	2.0	.....	...
32x8WB	1,307	0.5	.....	...
36x7WB	60	0.0	.....	...
36x8WB	1,687	0.6	.....	...
36x9WB	477	0.2	.....	...
36x10WB	1,327	0.5	.....	...
38x7WB	4,317	1.7	.....	...
38x8WB	5,950	2.3	.....	...
38x9WB	3,322	1.3	.....	...
40x10WB	511	0.2	.....	...
44x6WB	704	0.3	.....	...
Cast Wheels				
10x5.00F	313	62.1	103	21.8
10x6.00F	124	24.6	255	53.9
24x10	4	0.8	.....	...
24x11¼	5	1.0	.....	...
24x13	2	0.4	.....	...
24x15	44	8.8	115	24.3
32x17	10	2.0	.....	...
40x15	2	0.4	.....	...
Airplane Rims				
All sizes	.....	...	635	0.0
Totals	5,932,338		4,886,883	

Tire Production Statistics

Pneumatic Casings

	Inventory	Production	Shipments
1938	8,451,390	40,906,735	43,132,302
1939	8,664,505	57,612,731	57,508,775
1940			
Jan.	9,388,742	4,976,548	4,276,512
Feb.	10,156,918	4,910,754	4,118,030
Mar.	10,836,239	5,031,153	4,351,657

Pneumatic Casings

	Original Equipment	Replacement Sales	Export Sales
1938	10,716,130	30,565,008	1,048,934
1939	18,207,556	38,022,034	1,279,185
1940			
Jan.	1,804,606	2,382,826	89,080
Feb.	1,974,273	2,057,092	86,665
Mar.	2,049,891	2,223,765	78,001

Inner Tubes

	Inventory	Production	Shipments
1938	8,165,696	37,847,656	40,292,614
1939	7,035,671	50,648,556	51,190,314
1940			
Jan.	7,633,798	4,286,924	3,826,667
Feb.	7,896,960	4,210,904	3,809,733
Mar.	8,182,653	4,399,550	4,113,735

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1937	51,934,040	$10,213,670
1938	26,606,048	4,147,318
1939	61,460,003	10,467,552
1940		
Jan.	7,639,568	1,412,728
Feb.	4,862,684	947,524

Data from Leather and Rubber Division, Washington, D. C.

Current Quotations

(*Continued from page* 76)

Vulcanzing Ingredients

Sulphur Chloride (*drums*).....*lb.* .035 / .04
Rubber .....100 *lbs.* 2.00
Telloy .....*lb.* 1.75
Vandex .....*lb.* 1.75
(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky....*lb.*
2 N.C. .....*lb.*
3 N.C. .....*lb.*
1 Yellow .....*lb.*
2 .....*lb.*
Montan, crude .....*lb.*

World Net Imports of Crude Rubber—Long Tons

Year	U.S.A.	U.K.†	Argentine	Australia	Belgium	Canada	France	Greater Germany‡	Italy	Japan	Poland	Sweden	U.S.S.R.	Rest of World	Total
1937...	592,500	135,900	9,500	19,300	15,000	36,100	60,000	115,000	24,000	62,200	6,100	6,700	30,400	52,600	1,120,400
1938...	406,300	168,172	7,700	12,300	11,300	25,700	58,100	107,900	28,200	46,300	7,900	8,300	26,800	49,200	928,000
1939...	486,348	....	9,552	16,615*	9,593	32,508	....	....	....	42,351	....	....	....	59,928	....
1939															
Jan. ..	36,614	7,121	417	954	898	2,867	4,694	9,095	2,133	2,553	665	643	4,000*	4,282	70,651
Feb. ..	30,578	8,087	1,092	1,785	1,068	1,451	5,327	8,348	2,025	3,263	709	467	1,000*	4,824	66,710
Mar. ..	45,286	12,092	440	1,324	1,242	2,458	4,503	9,028	1,525	4,019	985	581	2,000*	4,901	86,374
Apr. ..	31,590	7,129	786	1,138	855	1,559	5,650	9,316	1,926	3,579	673	994	2,000*	4,614	69,432
May ..	45,390	10,488	353	1,202	792	3,069	4,646	9,031	1,573	4,438	940	1,047	1,000*	5,818	86,830
June ..	33,950	10,287	965	1,348	621	2,465	4,649	8,677	1,992	3,067	693	2,252	500*	4,800	74,295
July ..	36,932	6,205	983	1,472	836	3,214	4,282	8,849	1,408	3,668	750*	644	1,000*	4,541	72,520
Aug. ..	38,319	9,391	619	2,182	952	2,187	....	....	....	3,146	....	1,057	2,500*	5,286	77,030
Sept. ..	36,197	....	965	875	108	2,639	....	....	....	2,801	....	280	....	4,819	....
Oct. ..	39,735	....	562	1,335	519	5,787	....	....	....	2,749	....	....	....	4,613	....
Nov. ..	41,478	....	359	1,500*	667	1,709	....	....	....	5,106	....	....	....	5,471	....
Dec. ..	70,279	....	2,011	1,500*	1,035	3,103	....	....	....	3,962	....	....	....	5,959	....
1940															
Jan. ..	71,519	....	....	....	....	5,047	....	....	....	....	....	....	....	....	....

* Estimated. †U. K. figures show gross imports, not net imports. ‡Including imports of Austria and Czechoslovakia. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

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Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

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(Incorporating Lea Bridge Aircraft Ltd.)

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Lea Bridge Rubber Works Ltd.
Lea Bridge,
London,
E. 5.
ENGLAND.

(*Advertisements continued on page* 83)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	—January, 1940— Quantity	Value	—January, 1939— Quantity	Value
UNMANUFACTURED—*Free*				
Liquid latex (solids).....*lb.*	7,639,568	$1,412,728	3,589,452	$599,927
Jelutong or pontianak....*lb.*	1,371,003	155,570	1,887,393	203,753
Balata .....*lb.*	75,244	19,478	136,059	20,417
Gutta percha .....*lb.*	338,065	53,450	200,169	31,389
Guayule .....*lb.*	286,600	27,901	505,100	49,580
Scrap and reclaimed.....*lb.*	653,593	17,698	403,746	6,116
Totals	10,364,073	$1,686,825	6,721,919	$911,182
Misc. rubber (above), 1,000 *lbs.*	10,364	$1,686,825	6,722	$911,182
Crude rubber.....1,000 *lbs.*	154,465	26,314,500	78,970	12,313,006
Totals .....1,000 *lbs.*	164,829	$28,001,325	85,692	$13,224,188
Chicle, crude .....*lb.*	2,073,495	$673,798	2,687,502	$728,092
MANUFACTURED—*Dutiable*				
Rubber tires .....*no.*	8,408	$25,353	2,413	$3,602
Rubber boots, shoes and overshoes .....*prs.*	6,325	1,406	780	204
Rubber soled footwear with fabric uppers .....*prs.*	72,938	11,905	67,057	6,547
Golf balls .....*no.*	30,576	2,150	4,704	875
Lawn tennis balls.....*no.*	134,580	10,108	57,216	5,101
Other rubber balls.....*no.*	365,966	14,739	408,956	17,765
Other rubber toys.....*lb.*	.....	4,487	31,433	5,137
Hard rubber combs.....*no.*	.....	.....	45,360	3,354
Other manufactures of hard rubber	.....	4,476	.....	186
Friction or insulating tape.*lb.*	3,039	2,828	10,139	4,190
Belts, hose, packing, and insulating material	.....	18,871	.....	10,771
Druggists' sundries of soft rubber	.....	1,064	.....	2,249
Inflatable swimming belts, floats, etc. .....*no.*	155,948	9,583	89,186	5,403
Other rubber and gutta percha manufactures	.....	21,393	50,514	16,384
Totals	.....	$128,363	.....	$81,768

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber .....*lb.*	2,139,929	$447,673	1,048,892	$165,663
Balata .....*lb.*	39,525	12,321	2,000	190
Other rubber, rubber substitutes and scrap.....*lb.*	2,236	313	50,374	2,565
Rubber manufactures (including toys)	.....	4,688	.....	405
Totals	.....	$464,995	.....	$168,823

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed .....*lb.*	2,371,407	$125,914	1,676,054	$87,668
Scrap .....*lb.*	6,558,084	104,765	7,696,354	98,121
Cements .....*gal.*	28,062	31,982	25,343	24,205
Rubberized auto cloth.*sq. yd.*	18,490	10,036	16,541	8,086
Other rubberized piece goods and hospital sheeting.*sq. yd.*	148,126	51,764	226,342	86,786
Boots .....*prs.*	12,464	33,411	2,933	7,242
Shoes .....*prs.*	9,146	6,237	3,010	2,626
Canvas shoes with rubber soles .....*prs.*	30,342	23,053	26,265	17,602
Soles .....*doz. prs.*	3,104	5,704	2,018	3,916
Heels .....*doz. prs.*	30,475	19,665	39,530	19,234
Soling and top lift sheets.*lb.*	108,472	19,048	74,909	12,351
Gloves and mittens..*doz. prs.*	11,453	27,750	5,225	11,793
Water bottles and fountain syringes .....*no.*	27,790	9,602	11,918	4,272
Other druggists' sundries...	.....	63,154	.....	43,760
Gum rubber clothing....*doz.*	12,756	27,371	28,924	32,343
Balloons .....*gross*	19,419	16,259	20,772	17,967
Toys and balls	.....	7,828	.....	5,291
Bathing caps .....*doz.*	3,088	6,016	1,776	3,475
Bands .....*lbs.*	25,277	12,430	20,805	8,570
Erasers .....*lb.*	23,742	13,316	22,991	12,545
Hard rubber goods				
Electrical battery boxes.*no.*	29,443	20,069	23,428	14,716
Other electrical.....*lb.*	33,485	13,153	25,376	5,723
Combs, finished .....*doz.*	18,047	8,966	5,665	3,664
Other hard rubber goods...	.....	9,107	.....	12,430
Tires				
Truck and bus casings.*no.*	40,908	843,290	16,291	307,331
Other auto casings....*no.*	54,116	604,088	53,361	642,991
Tubes, auto .....*no.*	69,687	121,523	62,880	87,966
Other casings and tubes.*no.*	7,028	36,132	5,735	50,092
Solid tires for automobiles and motor trucks....*no.*	872	19,935	86	3,102
Other solid tires.....*lb.*	11,995	3,699	21,358	3,292
Tire sundries and repair materials .....*lb.*	186,393	59,076	101,230	31,624
Rubber and friction tape..*lb.*	104,448	26,932	40,520	13,743
Fan belts for automobiles.*lb.*	48,901	25,473	45,275	26,143
Other rubber and balata belts .....*lb.*	423,503	209,729	233,368	124,984
Garden hose .....*lb.*	100,547	17,880	44,778	8,852
Other hose and tubing....*lb.*	1,083,920	430,674	382,732	135,451
Packing .....*lb.*	156,133	72,763	91,552	43,625
Mats, matting, flooring, and tiling .....*lb.*	112,639	15,358	133,101	18,062
Thread .....*lb.*	82,112	59,087	36,984	31,631
Gutta percha manufactures.*lb.*	191,276	56,543	26,405	7,993
Latex (d.r.c.) and rubber sheets processed for further manufacture.....*lb.*	52,892	12,716	.....	.....
Other rubber manufactures..	.....	182,139	.....	91,604
Totals	.....	$3,463,637	.....	$2,172,872

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	Twelve Months Ended December, 1938 Quantity	Value	Twelve Months Ended December, 1939 Quantity	Value
UNMANUFACTURED				
Crude rubber, etc.....*lb.*	57,562,865	$8,144,296	70,816,852	$11,357,055
Latex (dry weight).....*lb.*	*	*	1,999,768*	447,537*
Gutta percha .....*lb.*	13,428	6,774	12,116	8,366
Rubber, recovered .....*lb.*	9,469,900	493,898	14,932,300	761,342
Rubber, powdered, and gutta percha scrap .....*lb.*	5,073,600	86,409	6,080,000	96,696
Balata .....*lb.*	22,417	4,643	21,633	4,122
Rubber substitute .....*lb.*	324,900	66,411	343,200	74,733
Totals	72,467,110	$8,802,431	94,205,869	$12,749,851
PARTLY MANUFACTURED				
Hard rubber comb blanks...	.....	$8,258	.....	$31,241
Hard rubber, n. o. s.....*lb.*	35,790	21,252	42,035	29,609
Rubber thread not covered.*lb.*	45,338	33,800	64,359	49,697
Totals	81,128	$63,310	106,394	$110,547
MANUFACTURED				
Bathing shoes .....*pairs*	71,848	$15,089	61,802	$13,180
Belting	.....	96,033	.....	122,136
Hose	.....	94,370	.....	134,487
Packing	.....	54,456	.....	72,076
Boots and shoes.....*pairs*	31,212	23,702	46,238	41,726
Canvas shoes with rubber soles .....*pairs*	115,537	36,785	133,177	47,682
Clothing, including waterproofed	.....	41,969	.....	38,912
Raincoats .....*number*	18,392	58,191	18,603	61,507
Gloves .....*dozen pairs*	4,908	13,336	8,274	23,630
Hot water bottles.....	.....	11,843	.....	11,208
Liquid rubber compound...	.....	71,147	.....	119,257
Tires, bicycle.....*number*	142,217	68,296	81,505	41,630
Pneumatic .....*number*	21,522	242,559	29,769	474,821
Solid for automobiles and motor trucks...*number*	343	14,452	209	11,057
Other solid tires.....	.....	12,498	.....	10,845
Inner tubes .....*number*	5,784	13,058	12,937	36,778
Bicycle .....*number*	†	†	36,071†	8,328†
Mats and matting.....	.....	54,647	.....	61,127
Cement	.....	75,371	.....	85,586
Golf balls .....*dozens*	31,449	67,442	36,695	78,196
Heels .....*pairs*	48,081	2,882	77,334	5,013
Other rubber manufactures.	.....	1,355,958	.....	1,756,731
Totals	.....	$2,424,084	.....	$3,255,913
Totals, rubber imports.	.....	$11,289,825	.....	$16,116,311

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Waste rubber	$76,855	.....	$129,399	.....
MANUFACTURED				
Belting	$618,745	.....	$661,830	.....
Bathing caps	‡	.....	6,414	.....
Canvas shoes with rubber soles	945,776	.....	1,079,809	.....
Boots and shoes				
Clothing, including waterproofed	3,524,635	.....	4,016,247	.....
Heels	453,151	.....	522,614	.....
Hose	168,685	.....	124,820	.....
Soles	246,595	.....	357,066	.....
Soling slabs	166,624	.....	132,309	.....
Tires, pneumatic	.....	.....	32,114	.....
Not otherwise provided for	7,232,942	.....	7,374,194	.....
Inner tubes	110	.....	900	.....
Other rubber manufactures.	671,610	.....	649,141	.....
Totals	798,814	$54,363	680,487	$43,053
Totals, rubber exports.	$14,827,687	$54,363	$15,637,945	$43,053
	$14,904,542	$54,363	$15,767,344	$43,053

*Included in crude rubber prior to Apr., 1939. †Included in pneumatic tires prior to Apr., 1939. ‡Included in clothing.

Imports by Customs Districts

	—February, 1940— *Crude Rubber Pounds	Value	—February, 1939— *Crude Rubber Pounds	Value
Massachusetts	9,026,510	$1,642,052	9,865,167	$1,630,953
St. Lawrence	4,450	801	.....	.....
New York	61,847,136	10,556,143	43,436,896	6,907,467
Philadelphia	572,959	92,826	860,026	127,655
Maryland	6,339,579	1,052,381	1,036,136	147,508
Georgia	.....	.....	61,600	9,153
Mobile	302,400	53,462	91,536	12,643
New Orleans	7,959,213	1,385,822	5,605,980	825,333
Galveston	100,800	18,088	44,800	6,664
El Paso	112,000	10,798	.....	.....
Los Angeles	8,518,462	1,460,899	8,046,571	1,232,931
San Francisco	369,600	68,398	475,356	73,058
Oregon	11,200	2,408	.....	.....
Ohio	792,699	154,022	.....	.....
Tennessee	112,150	18,645	.....	.....
Colorado	448,000	79,547	.....	.....
Totals	96,517,158	$16,596,292	69,524,068	$10,973,365

*Crude rubber including latex dry rubber content.

Classified Advertisements

Continued

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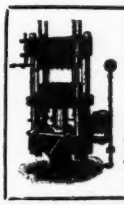

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Rubber Questionnaire—4th Quarter, 1939*

	Long Tons			
	Inventory at End of Quarter	Production	Shipments	Consumption
RECLAIMED RUBBER				
Reclaimers solely (5)	4,716	23,721	24,353	.....
Manufacturers who also reclaim (17)	6,358	17,385	3,917	15,582
Other manufacturers (116)	6,570	.....	.....	17,323
Totals	17,644	41,106	28,270	32,905

	Long Tons		
SCRAP RUBBER	Inventory	Consumption	Due on Contracts
Reclaimers solely (5)	43,661	26,607	19,276
Manufacturers who also reclaim (16)	33,772	21,042	12,169
Other manufacturers (13)	155	.....	.....
Totals	77,588	47,649	31,445

Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

PRODUCTS	Rubber Consumed Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Tire and Tire Sundries		
All types pneumatic casings (except bicycle, airplane)	74,089	$82,196,000
All types pneumatic tubes (except bicycle, airplane)	10,725	10,289,000
Bicycle tires, including juvenile pneumatics (single tubes, casings, and tubes)	931	1,482,000
Airplane tires and tubes	110	332,000
Solid and cushion tires for highway transportation	71	99,000
All other solid and cushion tires	128	309,000
Tire sundries and repair materials	2,644	3,686,000
Totals	88,698	$98,393,000
OTHER RUBBER PRODUCTS		
Mechanical rubber goods	13,089	$39,527,000
Boots and shoes	4,272	13,519,000
Insulated wire and cable compounds	1,768	†
Druggists' sundries, medical and surgical rubber goods	1,073	3,005,000
Stationers' rubber goods	612	838,000
Bathing apparel	92	85,000
Miscellaneous rubber sundries	1,048	2,403,000
Rubber clothing	88	612,000
Automobile fabrics	148	437,000
Other rubberized fabrics	1,231	3,572,000
Hard rubber goods	684	2,802,000
Heels and soles	3,194	5,971,000
Rubber flooring	410	680,000
Sponge rubber	1,594	2,113,000
Sporting goods, toys, and novelties	627	1,618,000
Totals	29,930	$77,182,000
Grand totals—all products	118,628	$175,575,000

Inventory of Rubber in the United States and Afloat

	Long Tons	
	Crude Rubber on Hand	Crude Rubber Afloat
Manufacturers	63,524	26,855
Importers and dealers	30,010	53,961
Totals	93,534	80,816

*Number of rubber manufacturers that reported data was 192; crude rubber importers and dealers, 46; reclaimers (solely), 5; total daily average number of employes (reporting manufacturers and reclaimers), 147,092.

It is estimated that the reported grand total crude rubber consumption is 74.8%; grand total sales value, 75%; the grand total crude rubber inventory, 66.9%; afloat figures, unavailable; the reclaimed rubber production, 67.5%; reclaimed consumption, 62.6%; and reclaimed inventory, 69.4% of the total of the entire industry.

† Owing to the difficulty of securing representative sales figures this item has been discontinued.

Compiled from R.M.A. statistics.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce Room, 734, Custom House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
*6697	Elastic thread, uncovered	Buenos Aires, Argentina
†6702	Rubber sheets, heels, and soles	Zurich, Switzerland
*6749	Wiring supplies and electrical fittings	Cairo, Egypt
*6766	Lacquers, fillers, plasticizers, etc.	Pernambuco, Brazil
*6775	Rollers for printers	Brussels, Belgium
‡6777	Surgical gloves	Brussels, Belgium
†6779	Dental equipment and accessories	Dublin, Ireland
*6780	Bathing caps, druggists' sundries, buttons and buckles	Johannesburg, South Africa
*6783	Imitation leather and oilcloth	Valparaiso, Chile
‡6794	Adhesive tape	Rio de Janeiro, Brazil
‡6801	Wiring supplies	Alexandria, Egypt
*6820	Insulated wire	Manila, Philippine Islands
†6835	Heels and soles	Baghdad, Iraq
*6846	Cables, wires and accessories	Cairo, Egypt
†6895	Rubberized rayon fabrics	St. Catherines, Canada
†6897	Canvas rubber-soled shoes	Santiago, Chile
‡6898	Hose	Alexandria, Egypt
‡6909	Wiring materials and devices	Rio de Janeiro, Brazil
‡6929	Fountain pens and pencils	Singapore, Straits Settlements
*6952	Druggists' sundries	Cairo, Egypt
*6973	Pencils and stationery supplies	Cairo, Egypt
‡6974	Dental burrs, artificial teeth, and rubbers	Alexandria, Egypt
‡6981	Rubber goods	Brussels, Belgium
*6984	Buttons	Cairo, Egypt
‡6986	Sporting goods	Brussels, Belgium
*7015	Wiring and electrical accessories including insulated cable	Cairo, Egypt
*7016	Storage batteries	Istanbul, Turkey
*7048	Combs	Manila, Philippine Islands
*7049	Bicycle tires and storage batteries	Johannesburg, South Africa
*7061	Combs	Vancouver, Canada

*Agency. †Purchase. ‡Purchase and agency.

Trade Lists Available

The Commercial Intelligence Division recently compiled the following trade lists, of which mimeographed copies may be obtained by American firms from the U. S. Bureau of Foreign and Domestic Commerce or its district or cooperative offices by referring to the titles. The price is 10¢ a list for each country.

Automotive products, manufacturers, India, Union of South Africa, Palestine.
Dental supply houses, India.
Rubber goods, manufacturers, Australia, New Zealand, Portugal, Union of South Africa.
Scrap rubber, importers and dealers, Turkey.
Sporting goods, importers and dealers, India, New Zealand, Philippine Islands, Portugal.

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because additional information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	INQUIRY
2744	Manufacturers of cement for bonding rubber to metal.
2745	Manufacturers of rubber fan blades.
2746	Manufacturers of burlap top matting.
2747	Manufacturers of stair treads with sponge rubber back.
2748	Manufacturers of smooth rubber flooring with sponge rubber back.
2749	Manufacturers of aluminum forms for dipping latex goods.
2750	Manufacturer of "Kork-tex."
2751	Manufacturers of ping pong saddle rubber sheet.
2752	Manufacturers of metal lasts for rubber galoshes.
2753	Manufacturers of taping machines.
2754	Manufacturers of latex spreaders.
2755	Suppliers of thin green rubber sheets.
2756	Manufacturers of sulphur grinding machines.

Dividends Declared

COMPANY	STOCK	RATE	PAYABLE	STOCK OF RECORD
Baldwin Rubber Co.	Com.	$0.125 extra	Apr. 20	Apr. 15
Baldwin Rubber Co.	Com.	$0.125 reg.	Apr. 20	Apr. 15
Collyer Insulated Wire Co.	Com.	$0.10	Apr. 1	Mar. 25
Dayton Rubber Mfg. Co.	A	$0.50 q.	May 1	Apr. 18
Detroit Gasket & Mfg. Co.	Pfd.	$0.30 q.	June 1	May 15
De Vilbiss Co.	Com.	$0.25 irreg.	Apr. 15	Mar. 30
De Vilbiss Co.	7% Pfd.	$0.175 q.	Apr. 15	Mar. 30
Dunlop Rubber Co., Ltd.	4% Pfd.	extra	.....	.....
Dunlop Rubber Co., Ltd.	8% Pfd.	final	.....	.....
Hercules Powder Co.	Pfd.	$1.50 q.	May 15	May 3
Link Belt Co.	Com.	$0.25 q.	June 1	May 10
Link Belt Co.	Pfd.	$1.625 q.	July 1	June 15
Midwest Rubber Reclaiming Co.	Com.	$0.25	May 1	Apr. 20
Norwalk Tire & Rubber Co.	Pfd.	$0.875 q.	July 1	June 17
Pahang Rubber Co., Ltd.	Com.	$0.10	Mar. 30	Mar. 23
U. S. Rubber Reclaiming Co.	Pr. Pfd.	$0.50 on ar.	Apr. 2	Mar. 30
U. S. Rubber Reclaiming Co.	8% Pr. Pfd.	$0.50	Apr. 2	Mar. 30
S. S. White Dental Mfg. Co.	Com.	$0.15 q.	Mar. 14	Apr. 29

Rubber and Canvas Footwear Statistics

Thousands of Pairs

	Inventory	Production	Shipments
1937	20,430	74,102	67,191
1938	16,183	50,812	54,942
1939	16,388	60,612	60,377
1940			
Jan.	15,018	5,044	6,389
Feb.	15,319	5,062	4,761

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.